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ABSTRACT

Children are natural scientists and are constantly questioning and challenging the world around them. This book is designed to help preschool and primary teachers see the science in common things. It is a book of manipulative activities that are designed to nurture a child's natural curiosity as well as integrate science with other areas. Reproducible lab sheets are included to help students learn to classify and organize data. Each activity includes a materials list, preparation, focusing activity, procedure, evaluation activity, and extension activities. The 29 activities include experiences with the properties of air, colors, bubbles, insects, graphing, dissolving, evaporation of water, bouyancy, simple machines, plants, senses, microscopes, classifying, animals, massing objects, foods, sounds, magnetism, health, friction, and changes of state. A teacher's guide to the scientific method and directions for using this book are included. (CW)

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Preschool
Grade 1

Small Wonders

Hands-On Science Activities for Young Children

A GOOD YEAR BOOK

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Peggy K. Perdue

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Small Wonders

Small Wonders

Hands-On Science Activities for Young Children

Peggy K. Perdue

Illustrated by Karen Waiksnis DiSorbo

Scott, Foresman and Company

Glenview, Illinois London

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To my husband, Jeff, and my friend Diane Vaszily,
who have touched my life and helped me to grow

Preface

Young children are natural scientists. They are constantly questioning and challenging the world around them.

This book is designed to help preschool and primary teachers see the science in common items found in a child's world. Since children learn better when they are actively involved, *Small Wonders* is a book of hands-on activities that will nurture a child's natural curiosity as well as integrate science with other areas.

The reproducible lab sheets included in *Small Wonders* (pages 52–66) will help students to classify and organize data. By recording data, as in graphing, students retain information for a longer period of time than if they record no data. The charts and graphs on the lab sheets are designed for the students' level so that the lab sheets will still be meaningful to students after a week or a month.

Each activity in this book is divided into sections with detailed instructions. You need no special training in science to make these activities an exciting part of your classroom. Extension activities provide a wealth of ideas to keep science alive all year.

Carol Honess read the manuscript at various stages, and I take this opportunity to thank her.

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A Scientific Approach to the World

Every day we are confronted with problems. One of the most valuable skills we can teach our children is how to approach problems. The *scientific approach* is not only for science. It is applicable to all areas of life. The basic components of the scientific approach are outlined in sequence below.

Purpose

The *purpose* of an experiment is the question the experiment is designed to answer. "How does a ramp affect the distance a toy car travels?" "Which food group contains more fat?" "Which food do birds like the best?" A question gives direction to the activity and alerts children to what they should be looking for.

Hypothesis

Hypothesis is a big word for *guess*. Children love big words! Even young ones can add four- and five-syllable words to their vocabularies. The hypothesis is a guess that answers the purpose. Because it is a guess, it might be right or wrong. "I think the cars will crash with a ramp." "Meat has the most fat. My mommy cuts it off." "Birds like worms the best!" Children are often concerned when their hypothesis is wrong. Stress that scientists often make a wrong hypothesis and that it is okay to do so. What is important is that the children, as good scientists, make an *educated guess* on how they think the activity will turn out.

Materials

Ask students what items they will need in order to do the activity. Make a picture list on the board. Try doing the activity with just the items they list. Is anything missing? What would they add? At first you will find the children have left out several items, but with continual practice, they will refine the skill of predicting what they will need.

Procedure

The *procedure* is a set of directions that tells how to do the activity. It helps children with sequencing and also clarifies the activity step by step. You may wish to make an abbreviated list of procedures on the board or a large piece of paper for the children to follow.

Observations

Often when we think of *observing*, we think of what we see. Observing, however, involves all of our senses: sight, smell, hearing, touch, and taste. The more senses you can involve, the more your students will understand and remember. Discuss what they are observing. Compare what each child observes. Are the observations all the same? Allow enough time for observations. Repetition of activities often increases the detail of observations.

Even young children can record their observations. By recording what they observe, they will be able to refer to it later and remember the experience. Use a tape recorder to capture the observations children verbalize. The children can make simple graphs with stickers, by gluing actual items in place, or by coloring. When children get the opportunity to record their observations in some way, their observations become important and valuable. Recording observations is great for their self-concept.

Conclusion

Stating the *conclusion* is probably the most difficult part of the scientific approach. Many children restate what they have observed and call it the conclusion. The conclusion should explain the results. To help children with the concept, use the word *because*. "The bigger ramp made the car go farther because it gave it a bigger push." While the children's conclusion may not be thorough, it will pull all the component parts of the activity together into a meaningful statement, one they can relate to their lives.

How to Use This Book

Even if science is a new area for you, *Small Wonders* will have you feeling comfortable and excited about sharing science with your students. The activities represent both life science and physical science. Each activity is divided into sections. A brief introduction to the activity gives an overview of the concept presented. It will help you decide at a glance the sequence of labs you should do with your class.

If your students are able to cooperate and share with one another, place them in teams of two whenever it is possible. This allows for a sharing of ideas. It will also help to reinforce the concepts presented as students discuss their observations. Scientists rarely work alone! If your students have not reached the developmental stage at which they can work with peers, start them as individual scientists and gradually guide them toward the team approach. Materials you will need for individual scientists and lab teams are listed under the headings *Materials per student* and *Materials per lab team of two*. The activities also list *Materials per class*. Items that will be needed for a class demonstration or to assist with student observations are listed here. Most of the materials required for the labs in this book are already in your classroom. If you are missing a few items, make a picture list, staple it to a paper grocery bag, and give one to each student. Tell the students they are on a treasure hunt for the items on the list. Be sure to go over the list with them! Often the children are delighted to contribute to the Science Lab.

How many times have you become involved in an activity and, for whatever reason, discovered that you should have gotten the movie projector, run off a worksheet, or made a visual to use in the activity? If it has ever happened to you, you know it is a frustrating experience! In *Small Wonders* any advance preparation is outlined in the section entitled *Preparation*. If the students need to have an entrance skill, such as being able to identify basic colors, or if you need to make copies of a lab sheet, it is noted under this heading.

The sections entitled *Focusing activity* and *Procedure for lab* describe in detail how to do the lab activity. Included in these sections are questions to ask and even some answers to anticipate from your class. Go over these sections prior to class to familiarize yourself with the material they contain. While reading, ask yourself the suggested questions. What other questions should you ask your class? Do your children have the necessary skills to be successful with the lab, or is there another lab you should do with them first? Can your students

work in teams, or is this an activity that would better be done by individual scientists?

From the start, you want to be sure the children understand the lesson. Too often, classroom evaluation takes the form of a paper and pencil test. Not only is this method of evaluation impractical for young children, it dampens their enthusiasm for learning, not to mention your enthusiasm for teaching. The section entitled *Evaluation activity* gives you an activity designed to help you determine whether the students understood the concept as it was presented.

While student interest in the subject is high, read through the section entitled *Extension activities*. You will find additional ideas to expand the lab activity into an entire unit as well as integrate other subject areas with science.

More Than Meets the Eye

This lab has students examining invisible air as they find out that an empty glass is not really empty.

Materials per student Clear plastic glass / Water (to go in glass) / Straw / Balloon

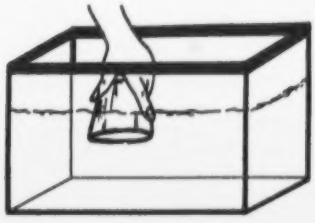
Materials per class Aquarium / Water / Blue food coloring / Clear plastic glass / Large self-sealing plastic bag

Preparation Fill an aquarium two-thirds full of water. Add several drops of food coloring. Stir to mix. Fill plastic glasses half full of clear water.

Focusing activity Gather students around the aquarium, with water already in it. Hold up a plastic glass for students to see. Ask students, "What is inside this glass?"

Turn the glass upside down and sideways while students respond. Most students will reply that the glass is empty, but do not acknowledge if the answers given are right or wrong.

Procedure for lab



Invert the glass, and slowly lower it straight into the water. Act amazed when no water goes into the glass. Ask students why the water is not going into the glass. What is keeping the water out?

Slowly tip the glass. When an air bubble escapes, act surprised. Ask, "What was that? I thought the glass was empty. What came out of the glass?" Allow students to hypothesize (guess). Repeat the demonstration if necessary.

Have students go back to their seats. Give each student a plastic glass of water and a straw. What will happen if students put the straw into the water and blow into the straw? Have students try. What is coming out of the "empty" straw? After observing, students will answer, "Bubbles." Ask what is inside the bubbles. What did they put into the straw that came out into the water?

Discuss air. Can they see air? Can they see the effects of air? What are some things that air (wind) can do?

Hold up an opened self-sealing plastic bag. Zip it shut, and hold it between your hands. Why can't your hands come together? What is inside the bag that prevents your hands from coming together? Is the air in one corner? Students should be able to see that air fills the entire bag.

Give each student a balloon. Have students inflate and hold the end of the balloons. (Inflating the balloons may be difficult, depending on your class and the quality of balloon. Be sure to

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test the balloons first.) How much of the balloon is filled with air? Is the air on only one side? Explain that air fills up the entire balloon. Have students allow the air to come out slowly so that they can feel it against their skin. What do they feel? Have students inflate the balloons again, using only a little air. What difference is there? What caused the difference?

Discuss what else contains air. Review that air is invisible and fills whatever container it is in.

Evaluation activity

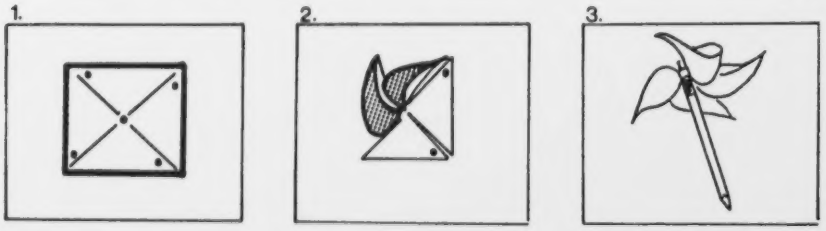
Have students bring in items or pictures of items that contain air. Place the items in a learning center, and display the pictures on the bulletin board for students to examine.

Extension activities

Have students put their hands on their sides and feel their lungs expand when they breathe. What is making their lungs get larger?

Have the class fly a kite. What is keeping the kite up?

Have students make pinwheels. Cut a piece of paper four to eight inches square for each student. Draw a line toward the center of the paper from each corner, stopping approximately one inch from the center. Put a dot on the left corner of each triangular section (make sure it is the same corner on each triangle) and one in the center of the paper. Have students cut along the lines. (This is an excellent chance for them to practice using scissors!) After all four lines have been cut, the corners with the dots should be brought to the center of the paper. Poke a straight pin through the center of the paper, making sure the pin goes through each corner brought to the center. Stick the pin into the eraser end of a pencil.



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Bubbles, Bubbles Everywhere!

Preschool children love bubbles. Bubbles offer you an excellent way to review colors, shapes, size, and gravity! This is a good lab to do outside so that if any bubble solution spills, the cleanup is minimal.

Materials per student

Bubble solution / Paper cup /
Pipe cleaner (available in most craft stores)

Materials per class

None

Preparation

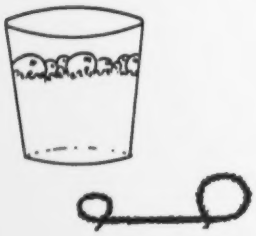
Before starting this lab, students should be able to identify basic colors, shapes, and sizes.

Pour a small amount of bubble solution into paper cups (enough cups so that each student has one). You can make an inexpensive bubble solution by mixing one part liquid dish soap with ten parts water.

Focusing activity

Before going outside, give each student a pipe cleaner. Let each student investigate the pipe cleaner for a few minutes. Ask how it feels. What color is it? Can it bend, or not? What do the students think it could be used for?

Procedure for lab



Have each student make a circle overhead with his or her arms. Then tell the students to make a tiny circle at one end of the pipe cleaner. Now tell them to make a big circle at the other end of the pipe cleaner. What does this reshaped pipe cleaner remind them of? Explain that they have just made a bubble wand. This Magic Wand will help them to make beautiful bubbles.

Take students outside. Pass out cups with bubble solution inside. Tell students you want them to dip the end that has the *little* circle into the bubble solution, hold the little circle up, and gently blow through it. "What colors do you see?" Students should name a variety of colors. "Are the bubbles big or little? Which direction do the bubbles go? Why? Can you make the bubbles go up? How? What shape are bubbles? Can you catch a bubble without popping it?"

Now have students dip the end that has the *large* circle into the bubble solution. Gently blow. "How are the bubbles different? How are the bubbles the same?"

Have students carefully push the sides of the large circle together so that it is now an oval instead of a circle. Dip it into the bubble solution. "What shape are the bubbles? Are they the same or different?"

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Encourage students to experiment. Can any of the students carry a bubble to you? Which bubbles are stronger, the small ones or the large ones? How many bubbles can students get from one blow?

Bring students inside for a circle discussion. Ask students what colors they saw in the bubbles. Did the little circle make big or little bubbles? Did the big circle make big or little bubbles? What shape were the bubbles from the round wand? What shape were the bubbles from the oval wand? Which direction did the bubbles go? What pulled the bubbles down? What could make the bubbles go up?

Make a square out of a pipe cleaner. Pour some bubble solution into a dish. Ask students what shape they think the bubble will be. After all students have had an opportunity to hypothesize (guess), dip the square into the solution. Gently blow. What are the similarities? The differences?

Evaluation activity

Have students pretend they are bubbles and float around the room. Remind students that bubbles are graceful and quiet! Ask them what colors they are. Watch how they move.

Extension activities

Learn "One Little, Two Little, Three Little Bubbles" (to the tune of "One Little, Two Little, Three Little Indians").

One little, two little, three little bubbles,
Four little, five little, six little bubbles,
Seven little, eight little, nine little bubbles,
Ten little bubbles go pop, pop, pop!

Learn "There Are Bubbles All Around" (to the tune of "If You're Happy and You Know It, Clap Your Hands").

There are bubbles all around, all around.
There are bubbles all around, all around.
There are bubbles all around,
In the air and on the ground,
There are bubbles all around, all around.

Pour a small amount of soda water into clear glasses. Have students observe the bubbles. Talk about the shape, size, and color of the bubbles and the direction in which the bubbles are moving.

Have students try different shapes of bubble wands. If students have commercial bubble wands at home, encourage students to bring the wands to class.

Try different bubble solutions. Does a different solution change the color, shape, or size of the bubbles? Does it make the bubbles last longer?

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Bug Off!

This lab will have students searching for insects as they try to determine how insects move and where they live.

Materials per student Toilet paper tube / Magnifying glass (if possible)

Materials per class Magnifying glass if one is not available for every one or two students

Preparation Have students bring in empty toilet paper tubes.

Focusing activity Tell students that they are going to play hide-and-seek outside. Explain that they are not going to be the hiders; they are going to be the seekers. Something is already hiding outside. Can they guess what it might be? Tell students that you will give them some hints, and proceed to name the characteristics of insects without telling the students what you are describing. Tell them that the hidden thing is a group of animals. Allow students to guess. The animals are very small. Again allow students to guess. The animals have six legs. Allow guessing. Continue giving hints until students either say, "Insects" (or "Bugs"), or give an example, such as "Ants."

Procedure for lab Give each student a toilet paper tube. Explain that these are their Bug Finders. Bug Finders will help them locate the insects. The tube narrows students' field of vision and helps them focus on a single item.

Ask students where they might find insects around the school. Where would they hide if they were an insect? Discuss some possibilities. Stress to students that they are *not* to harm an insect. They are to look at it. How does it move? Does it move in a straight line or a crooked one? What color is it? Is it bigger than their fingernail, or smaller?

Take students outside. Give each student a magnifying glass if available. If one is not available for every one or two students, have students take turns using the classroom magnifying glass. (This is a good opportunity for students to practice sharing!) Guide students around the school yard in search of insects. Encourage students to share their finds.

Evaluation activity Have a Bug Day on which each student brings a live bug in a jar with air holes in the lid or cheesecloth over the top. Did students bring in only bugs, or did they also bring in worms or spiders? Have students compare. Students should release the insects as close as possible to the place the insects were found.

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Extension activities

Play Red Light, Green Light, having students move like a butterfly, a grasshopper, an ant, and so forth. Select a leader to decide when the light is green and when it is red. When the leader says, "Green light," students move. When the leader says, "Red light," students stop.

Have pictures of insects at a learning center for students to look at. How many legs does each insect have?

Quite a Handful!

Counting! Classifying! Estimating! Graphing! Hypothesizing! Color identification! Your students will work with all these concepts in this lab by using Fruit Loops.* (You'll be amazed at how many Fruit Loops students can hold.)

Materials per student

Lab sheet (page 52) / Paper towel / Glue

Materials per class

Box of Fruit Loops /
Red, orange, and yellow circles (cut from construction paper) to represent Fruit Loops /
Tape

Preparation

Students should know how to count to ten. Duplicate the lab sheet so that each student can have a copy. Draw a graph on the board that is like the one on the lab sheet, for students to see.

Focusing activity

Hold up a Fruit Loop, and ask students to describe what you are holding. If necessary, prompt students with questions such as "What shape is it? What color is it? Is it smooth? What size is it?" When students have listed several of the cereal's characteristics ask, "Does anyone know the name of what I am holding?" At least one student will probably be able to identify the cereal as Fruit Loops.

Procedure for lab

Ask each student to hold up a hand. Is the hand bigger or smaller than the Fruit Loop? Ask each student how many Fruit Loops would fit in his or her hand. Expect some wild estimates! How could they find out? Allow students to come up with ways they would test their hypotheses.

Prior to testing, remind students that they are *not* to eat the Fruit Loops because they will be doing something special with them. Give each student a paper towel. Have each student

*Fruit Loops is a registered trademark of the Kellogg Company.

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reach into the cereal box and pull out a handful of Fruit Loops. Tell students to put their handful on the paper towel. Encourage students to count how many Fruit Loops fit into their hand. Was their hypothesis right or wrong? Most students will tell you it was right, no matter what they originally said. You may wish to say that your own hypothesis was wrong so that they understand that a hypothesis can be wrong without anything bad happening.

Have students look at the handful they gathered. What colors are in Fruit Loops? Have students separate the Fruit Loops by color.

Direct students' attention to the board. Tell students that the squares on the board will help show how many Fruit Loops of each color the students have. Point to the word *Red*. Ask what color they think this word is. Tell students that in your handful, you have three red Fruit Loops. Take three red circles and tape one in each square in the *Red* column, starting at the bottom and going up. Explain that each red Fruit Loop can fit in one square on the graph.

Hand out a lab sheet to each student. Tell students to put their red Fruit Loops in the *Red* column of their paper, starting at the bottom and going up. Have students put a little glue on each red Fruit Loop and position it on the paper. Repeat the procedure for the orange and yellow Fruit Loops.

Have students count and share how many of each color they had in their handful. Of which color Fruit Loops did they have the most? Of which color did they have the least? Did anyone get only one color? Did anyone get at least one of each color? Allow the graphs to dry undisturbed on a flat surface. Display the graphs so that students can compare results.

Evaluation activity

Repeat the experiment with other materials. How does the size of the material affect how many will fit into a hand? With practice, students will refine their ability to predict results.

Extension activities

As a math exercise, ask students how many red pieces and orange pieces they have. How many orange and yellow? How many yellow and red?

Have students practice hand-eye coordination by stringing the Fruit Loops on yarn. Display a pattern of colors, and have students repeat the pattern as they string. (This gives students good practice in a prereading skill.)

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A Large Box of Crayons

When you think of the colors of nature, the colors green, blue, and brown come to mind. But there is literally every color of the rainbow in nature. This lab will have students out and looking for the variety of colors that can be found. They will also discover that some colors are more prevalent than others.

Materials per student

Paint color chip (available at any store that sells paint) *or* / Small construction paper rectangle (try to get a different color or shade for each student)

Materials per class

None

Preparation

Go to a paint store and get a variety of paint chips, the color samples that are generally available free of charge. Cut the colors apart.

Prior to lab, go out and get an idea of what colors are readily visible to the students and what colors will need more careful observation.

Before this lab, students should be able to recognize and correctly identify the basic colors and be able to classify items that are of human manufacture and items found in nature.

Stress that students are *not* to eat anything they may find. (Many tempting plants are poisonous!)

Focusing activity

Ask students what colors can be found in nature. Tell them that for today's lab they are going to become *detectives*. Each student will have a different color to hunt for in nature. Have each student use creative dramatics to put on an imaginary Detective Hat. Admire how much the children look like real detectives.

Procedure for lab

Review rules you have for being outside. *Stress to students that they are not to eat anything they find!*

Remind students that animals are afraid of people, especially noisy ones! Tell them to be quiet so they can see even more colors. They should not remove anything from nature, especially if it is attached, as a leaf is to a tree.

Hand out rectangles of different colors to students. Go outside, and begin the investigation. When students think they have found a match to their color chip, they should hold it next to the item in nature. Students are to stay together so that all can see the color matches. After the investigation, discuss the colors found.

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Evaluation activity

Have students draw a picture showing the different items and colors that were found in nature.

Extension activities

Have students look for items around their homes that are different colors.

Have students sort the color chips and put them into color families.

Hocus Pocus!

What child can resist a race? During this lab, students will observe a race between hot and cold water to see which can make a sugar cube dissolve faster. Heat makes molecules move more rapidly.

Materials per student

Hot water / Refrigerated water /
Food coloring (red and blue) / Two sugar cubes /
Lab sheet (page 53) / Two clear plastic glasses

Materials per class

Black and white construction paper /
Crayons or markers, one red and one blue

Preparation

Heat water, or use hot tap water, for *Hot* water. Use refrigerated water for *Cold* water.

For each student, put one drop of red food coloring on a sugar cube and one drop of blue food coloring on another sugar cube. The coloring will aid in visualization.

Make a black-and-white checkerboard flag from construction paper.

Duplicate one lab sheet for each student. Cut apart the *Hot* and *Cold* sections along the line. Using crayons or markers, highlight the word *Hot* in red and the word *Cold* in blue.

Fill half of the glasses partway with hot water. Fill the other glasses partway with cold water.

Focusing activity

With enthusiasm, tell students that everyone is going to the races. The students will get to be the spectators as well as the judges who determine the winners. Explain that the race is going to be held between two tough competitors, hot and cold water. Hot and cold water will be competing to see which can make a sugar cube disappear first.

Now is a good time to go over safety procedures. Tell students that the hot water could burn if it were spilled. They are to be extremely careful so they do not spill the water.

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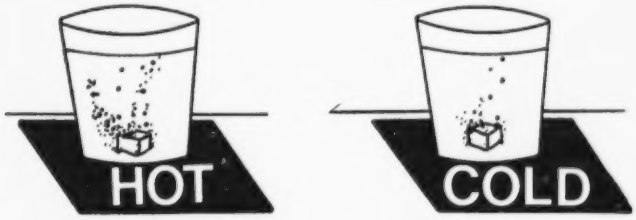
Procedure for lab

Hand out the sugar cubes, as well as the half lab sheets students will use to label the glasses *Hot* and *Cold*. Explain to students that they are using sugar cubes in this experiment. (Students must not eat the sugar cubes!) Students will ask why each sugar cube has a colored dot on it. Explain that you added food coloring to the sugar to make it easier for them to *observe*. They should put the sugar cube with the red dot on the paper with the red letters and the sugar cube with the blue dot on the paper with the blue letters.

Hand out the glass that is half full of refrigerated water. Students should set the glass on the paper marked *Cold*. Remind them not to put the sugar cube in the water yet. In a race, everyone must start at the same time.

Hand out the glass that is half full of hot water. Again, remind students that the water is hot. Tell them to place the glass on the paper marked *Hot*. Tell students not to put the sugar cube in yet (expect a few early starts!).



Hold the checkered flag up. Explain that when you say go, students should drop the red sugar cube in the hot water and the blue sugar cube in the cold water. Say, "On your mark, get set, *go*!" and drop the checkered flag. Ask who is winning the race. Where is the sugar going? Does it really disappear?

At the conclusion of the lab, ask students who won the race. Did everyone get the same results? Why do they think the hot water won? Give students enough time to answer. Help them in understanding that heat makes molecules move faster. What is a *molecule*? A molecule is the tiniest piece an object can be and still be the object. If they were to take a cookie and keep breaking it until they had pieces so small they couldn't see them, those tiny pieces would be cookie molecules. Remind students that if *they* touch something hot, *they* move fast, too.

Have students put their finger in the cold (blue) water and then taste it. Did the sugar disappear? Tell students that the sugar molecules didn't really disappear; they *dissolved*. When sugar dissolves, the sugar breaks into sugar molecules, and the sugar molecules fit between the water molecules and hide.

Evaluation activity

Have students do a creative movement activity. First have them move as sugar molecules in cold water. Observe to see if

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movement is slow. Then have students move as sugar molecules in hot water. Observe to see if movement is fast.

Extension activities

Prepare packaged gelatin in class. If the students want the powder to dissolve, which liquid do they add first, the hot or the cold? This will also provide students with the opportunity to measure.

Repeat the sugar cube experiment, and have students time the results.

Repeat the experiment using different colors of food coloring. Does a different color change the results?

Repeat the experiment using salt. Are the results the same?

What happens if students use tap water? Does it dissolve the sugar faster?

Rain, Rain, Go Away!

Most preschool children know the poem "Rain, Rain, Go Away," but just where do puddles go? With this lab, students will begin to understand the meaning of the term *evaporation*. *Note:* This activity will take longer in humid weather.

Materials per student

Clear plastic glass / Lab sheet (page 54) / Water /
Food coloring / Grease pencil or marker /
Crayon the color of the food coloring

Materials per class

Permanent marker / Sponge / Water / Chalkboard /
Piece of cardboard / Pitcher (optional) /
Large piece of paper (optional) / Extra glasses (optional)

Preparation

Write each child's name on a plastic glass for easy identification. Make a circle around the glass two-thirds of the way up so that students will know how much water to put in the glass.

Make a copy of the lab sheet for each student.

Focusing activity

Ask students what they think will happen if you make a circle of water on the chalkboard (be ready for some student to say that you will get into trouble!). Accept all their hypotheses. Moisten a sponge with water and make a circle on the chalkboard about the size of a dinner plate. Turn your back to the circle and begin talking with the students, reviewing their guesses. Allow time for the water to begin evaporating. Turn around to look at the circle, and act surprised that it has changed. Discuss what has just happened. Introduce the term *evaporation*.

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Ask students how the circle might evaporate faster. If possible, test out their ideas. Their suggestions may include making one circle large and one circle small or making two circles the same size and fanning one with a piece of cardboard. Discuss their observations.

Procedure for lab

Give each student a plastic glass to fill two-thirds full of water. Explain that students should fill the glass to the mark. If you wish, have them use a pitcher to fill the glass (to practice hand-eye coordination). Students should add one or two drops of food coloring to the water to aid with visualization.

Ask students what they think will happen to the water in the glass if the glass is set on the shelf (or wherever you will be placing it). Accept all hypotheses without acknowledging which is correct. You may wish to write down the hypotheses on a large piece of paper so that the class can refer back to them at the conclusion of the experiment.

Set the glasses in a place where they will not be disturbed. Each day have students observe the glass with their name and mark where the water level is on that day. Spend a few minutes discussing their observations. You can have extra glasses started in case a glass is accidentally spilled, or you can have the student set up the experiment again. Explain that scientists have many setbacks that force them to begin experiments again. Have students color in the correct glass on their lab sheet on days one, eight, and fifteen. Compare the results.

Remind students about the circle you made on the chalkboard with a wet sponge. Where did the water go? Where is the water going now? Students at this age may accuse you of emptying the glasses after they leave each day. Encourage the students to duplicate the experiment at home, where they can watch it. Ask if anyone remembers the term that means liquid going into the air (*evaporation*).

Evaluation activity

Have students draw a picture of the sidewalk right after a rainstorm and the same sidewalk the next day.

Extension activities

Repeat the above lab, except put some glasses where they receive light and some in the dark. Have students compare results. What helps with evaporation?

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Do all liquids evaporate at the same rate? Test different (*nonpoisonous*) liquids to see.

After a rainstorm, draw a circle around a puddle with chalk. Observe what happens over a period of time.

Buoy, Oh, Buoy

Children are fascinated by water. This lab takes advantage of that fact by creating an awareness of the density and shape of objects. Students will be examining, hypothesizing, testing, and classifying objects.

Materials per lab team of two

Miscellaneous objects to test. Teams may have the same objects so that answers can be compared and challenged, or teams may have different objects to expand the number tested. Objects might include a cotton ball; a small, flat piece of foil; foil rolled into a ball; a cork; a toothpick; a piece of sponge; a Ping-Pong ball; a Super Ball; or a paper clip. / Tray (optional) / Lab sheet (page 55) / Container to hold water / Water / Paper towels

Materials per class

None

Preparation

This lab requires very little preparation. Materials can be set up on a tray for each lab group or left together to require students to practice gathering their own materials.

Duplicate and cut the lab sheet apart so that each lab team will have two sheets, one labeled *Float* and one labeled *Sink*.

Focusing activity

Ask students what the word *float* means. What does *sink* mean (expect to hear about everything . . . including the kitchen sink!)? Ask students to give examples of objects that float and objects that sink.

Procedure for lab

After students have received their supplies, explain to the students that they are going to experiment with some objects to see what will float and what will sink. Ask students how they will be able to test an object to observe if it floats or sinks. Go over the procedure for the lab (*choose an object* to test, *hypothesize* if it will float or sink, *test* the hypothesis, and *classify* the object by placing it on the correct piece of paper).

This lab is a good one in which to have students progress at their own speed while you circulate among the lab teams. Ask students why one object floats while another sinks.

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When everyone has finished, compare the results. Did everyone get the same results? If there is disagreement, have students retest. Discuss why the crumpled piece of foil sank although the flat piece floated. Help students to verbalize that an object's weight *and shape* determine if it will float or sink.

Evaluation activity

Set up a learning center that allows students to test objects. Encourage students to bring objects from home to test.

Extension activities

Learn the words to "Rubber Duckie" (a Sesame Street favorite).

If students' interest continues, have them test objects in fresh and salt water. How do they compare?

And They're Off!

In this lab, students will be introduced to one simple machine, the inclined plane. They will explore how the angle of the ramp affects the distance a toy car travels.

Materials per student

None

Materials per class

Small toy car /
Board (approximately twelve by twenty-four inches) /
Books (to prop board) / Colored stickers / Marking pen

Preparation

If necessary, ask a student to bring in a toy car.

Focusing activity

Ask students what a *machine* is. Can they name any machines? Allow students time to respond. What good are machines? Students will need help thinking in general terms. Most will try to respond with specifics.

Show students the board and the books. Ask if they can make these objects into a machine. Give students the opportunity to identify and demonstrate their ideas.

Procedure for lab

Explain that the machine you were thinking of is an *inclined plane*. Make an inclined plane with one book and the board. Identify this as a *simple machine*. Why do students think it is called a simple machine? What other names does this simple machine have? Students may be able to state that it is a *ramp*. Tell the students that, since a machine helps to make a job easier, you wonder if this machine could make a toy car travel

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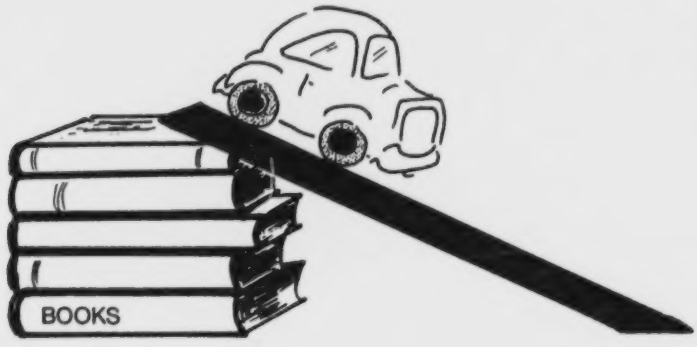
better. Do they think that a ramp will make the car travel farther? Ask students how you can find out the answer.



Have one student put the toy car at the top of the inclined plane. The student should let go of (not push) the car so that it travels down the ramp. Put a sticker on the ground with the number one on it to mark how far the car traveled with one book.

Ask students what they think would happen if the inclined plane were steeper. How can they find out? Again, set up the inclined plane, but this time use two books. Repeat the procedures used for one book, except put the number two on the sticker. Repeat the steps for up to five books in height for the inclined plane. Be careful not to shift the board as doing so would affect the angle of the inclined plane.

Discuss when the car went farther. What happened to the car as the inclined plane got steeper? Is an inclined plane a simple machine? Where are other inclined planes located?

Evaluation activity

Take a field trip to the playground. Can students find any examples of inclined planes? Have students use craft sticks to build their own playgrounds that utilize simple machines.

Extension activities

Have students measure the distance of each car from the inclined plane after the car stops rolling.

What simple machines can students find around their homes? Have students bring those machines in and discuss them in class. Some examples may be a *wedge* (doorstop), *wheel and axle* (toy car), or *winding inclined plane* (screw and bolt). Place items in a learning center for closer examination.

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What's in There?

Ask students what their favorite sandwich is; peanut butter will rank near the top. How many students know where peanut butter comes from (besides the grocery store)? In this lab, students will examine the peanut seed, make a hypothesis about what is inside, and then plant the seed to find out.

Materials per student Lab sheet (page 56) / Paper cup / Raw peanuts in the shell / Sandy, loamy soil

Materials per class Marker

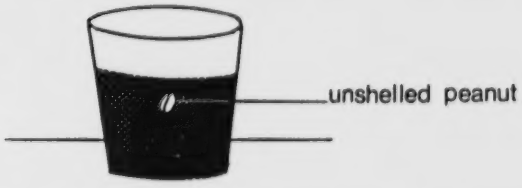
Preparation Duplicate the lab sheet, one copy for each student. Write each student's name on a cup.

Focusing activity Hand out one peanut in the shell to each student. Ask the students what they think is inside the shell. Accept all answers without acknowledging if they are right or wrong. Have students observe the shell. What is the function of the shell (*protection*)? What job does it do for the peanut?

Procedure for lab Have students carefully open the shell. What is inside? Have students draw the unshelled peanut on their lab sheet under *What the seed looked like when I planted it.*

Without much discussion, have students draw what they think will come out of the seed under *What I think will come out of the seed.*

Have students fill their cups two-thirds full of the soil.



They should plant the peanut with the pointed end up and the nub or rounded end down. Cover the peanut with about two centimeters of soil.

Students should place their cups in a warm, sunny location. The soil should be kept moist but not wet. Have students check their cups daily. Stress that they should not overwater their seed, or it may not live.

The seeds should germinate in five to seven days. Once the seeds have grown, have students make observations about what they see. They should then draw their observations.

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Evaluation activity

Discuss what came out of the peanut seed. What do students think would come out of an orange seed? An apple seed? A radish seed? The concept here is that seeds produce the same type of plant as they are from. We cannot get a radish plant from an apple seed.

Extension activities

Have students take a closer look at a peanut. After removing the shell, have students remove the skin. What do humans have that is like the peanut skin? What would be the function of the skin? Split the peanut open. What do they see inside? Point out the embryo. What does it look like?

Make a mobile using peanuts. This is a good way to teach the concept of equal and balanced weight.

Have students use a centimeter ruler to measure their plants as the plants grow. Students can graph the results.

Have a variety of seeds available for students to observe at a learning center. Don't forget a magnifying glass for closer observations.

Have a Peanut-Tasting Party. Students can compare salted, dry-roasted, Spanish, honey-dipped, cocktail, and unshelled peanuts.

Have students shell several peanuts. How many peanuts are in each shell?

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I'm Thirsty!

● This lab will give students a chance to view the tubes that transport liquid throughout a plant.

Materials per student Celery / Piece of masking tape, or label / Stable plastic glass / Lab sheet (page 57) / Water / Red or blue food coloring / Plastic knife / Large plastic bag / Pencil or crayon

Materials per class Marker / Chalkboard and chalk

Preparation The experiment happens more quickly if the celery is slightly limp.

Write each student's name on a piece of masking tape or a label. Attach the tape to the glass. Duplicate the lab sheet so that there is a copy for each student.

Focusing activity Ask students what they do when they are thirsty. Allow all students to respond. Ask how they think a plant drinks. Again, accept all responses.

Show students a bunch of celery. Ask them to identify it. When students tell you it is celery, ask if it is a plant or an animal. Point to the leaves and ask if anyone knows the name of this part of the plant. Point to the stalks and ask if anyone knows the name of this part.

Procedure for lab

Explain to students that they will be using the celery stalk to find out how a plant drinks. Hand out glasses.

Before you have the students fill the glasses, discuss what the word *half* means. Draw a glass on the board. Ask students to show you where half would be.

Have each student fill his or her glass a little more than half full. Students should add two drops of food coloring to the water. Use red or blue for the greatest visibility.

Give each student a stalk of celery. Tell students to put the celery in the water, leaf end up. Move the glasses to a place where they will not be disturbed.

Observe the celery again in two hours. What changes have occurred? Cut about four centimeters off the end of each stalk. If your students are capable of cutting with a plastic knife, allow them to do so. Have students describe what they see. The tubes that carry the water to the leaves are colored. Ask what made the tubes colored. Ask how the water gets into the leaves. Explain that in most plants, water travels through tubes that look like straws, only smaller. Students may wish to repeat the

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experiment with different colors of food coloring to confirm their results.

Have students place their stalk of celery in a plastic bag to take home to show their family.

Evaluation activity

Give each student a lab sheet, and have students draw a *Before* and an *After* picture of the celery. This will also give them practice at recording observations.

Extension activities

At snack time, have students drink their juice through straws.

Repeat the experiment using a white carnation. Split the stem, and stick half in red water and half in blue. Observe what happens.

Have students bring other plants to class. Do all plants respond the same way when placed in water?

Make Mine Buttered, Please

In this lab, students will be made aware of how they use their five senses when preparing and eating popcorn.

Materials per student

Napkin or bowl to hold popcorn

Materials per class

Corn popper / Oil / Measuring cup for oil / Popcorn / Butter / Salt (optional)

Preparation

This is a good lab to use as a follow-up to a lesson on the five senses.

Focusing activity

Gather students into a circle with the corn popper in the center. Ask students if they know the name of the object in the center. What can we do with it? What are some safety tips we need to keep in mind when we use a corn popper? Review safety rules.

Procedure for lab

Follow the corn popper's directions for popping corn. Allow students to participate by measuring and adding ingredients to the popper. Plug the corn popper in.

Ask students if they remember the names of our five senses. Allow time for students to respond, giving hints if necessary. Draw pictures on the board that represent each sense (an eye for sight, for example).

As the corn is popping, ask students which sense they are using. How are they using it? As students say what they see,

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hear, and smell, list the observations under the appropriate categories.

When the corn has finished popping, direct students' attention to the board. What senses have been used so far? Repeat that the senses of sight, hearing, and smell have been used.

Ask what would happen if you passed popcorn out to each student. Could they use any more of their senses? Hand popcorn out, either in small bowls or on napkins, to each student. What senses can they use now? Again, copy their answers onto the board. As lab continues, students should realize that they used all five senses, and have had a nutritious snack!

Evaluation activity

While students are working on an activity, ask them to name the senses they are using. How are they using each one?

Extension activities

Have students string popcorn with heavy thread and safety needles. Hang the popcorn strings outside, and observe which animals eat the popcorn.

Compare different types of popcorn. Purchase white, yellow, and colored popcorn. Have students compare the types before and after popping the corn.

If you have access to a simple balance, discover which is heavier, popped or unpopped popcorn. If you do not have a balance, you can make one by hanging identical bowls from each end of a coat hanger. For directions see the lab activity entitled *A Balancing Act* (page 27).

Do a ministudy of popcorn. How does it grow? What causes it to pop?

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Shape Up!

The more senses you can involve, the better the chance of retention. In this lab, students will use their senses of touch and hearing to identify circles, rectangles, squares, triangles, spheres, cubes, and pyramids.

Materials per student

Construction paper or plastic circles, squares, and triangles / Lunch bag / Round, square, and triangular candy / Small box (cigar, shoe, jewelry, or the like)

Materials per class

Simple musical instruments

Preparation

While students are not around, put one shape in each bag. Fold the top of the bag over.

Put one piece of candy (gumball, caramel, or candy corn, for example) in each small box. Seal the box.

Students should be familiar with the names of the shapes. If necessary, discuss the difference between a two-dimensional shape, such as a triangle, and a three-dimensional shape, such as a pyramid.

Focusing activity

Ask students to name some shapes. How would they describe each shape? How many sides does it have? How many corners? Is it flat when it is on a table, or does it stand up? (This question will help students distinguish between two- and three-dimensional shapes.)

Procedure for lab

For best results, hand out the bags one at a time. Students find a closed bag sitting near them impossible to resist! Have each student reach inside the bag *without looking* and try to guess the shape. What clues does the shape give? Have the student pull the shape out of the bag and reveal it to the class. Continue until each student has had a turn. Each time, stress the properties of the shape.

Discuss the shape and how it would move. Tell students to imagine the shape as a tire on a car. Have students stand up and pretend they are in the car. How would they move if the tire were a cube? A pyramid? A sphere? What would they hear?

Hand out sealed boxes to students, and have them slowly tip the boxes. Tell them that they will have to listen very carefully to hear the shape move. One at a time, have each student tip the box so that the class can listen. Have students make a hypothesis on what shape is inside. The box should be opened and the contents revealed (and then consumed!). Repeat until each student has had a turn.

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Evaluation activity

Bring in musical instruments (triangle, wood blocks, and so on). Have students identify the shape of each instrument. Allow time for a musical band.

Extension activities

Prepare a box that has a Mystery Shape inside. Set up at a learning station. Can students guess what is inside?

Have students try to move like a sphere, pyramid, or cube.

Take a Shape Walk. What shape is the easiest to find?

Some Day I'll Be Bigger!

Students love to examine objects under a microscope. Unfortunately, one is not always available. In this lab students build their own water microscope and use it to look at different objects.

Materials per student

Half-gallon milk carton or oatmeal box / Plastic wrap / Thick rubber band / Water / Objects to examine / Drawing paper / Pencil or crayon

Materials per class

Sharp knife to cut milk cartons or oatmeal boxes

Preparation

Have students bring in empty milk cartons and oatmeal boxes.

Cut one or two large holes in the side of each container so that students can place objects they want to see inside the container.

Focusing activity

Ask students what tools they would need if they were fire fighters. Give students time to respond. If they were doctors, what tools would they need? If they were scientists, what tools would they need? Explain that since they *are* scientists, they are going to make a tool scientists often use. The name of that tool is *microscope*. Ask if anyone has a microscope at home. Ask if anyone knows what a microscope does. If no one knows, do not tell! Tell students they are going to discover what a microscope does today in class.

Procedure for lab

Since scientists often work in groups, it is important that they work together today. It will take two scientists working together to build each microscope. Divide students into teams of two. Hand out a container with holes in the side, a piece of plastic wrap, and a rubber band to each student.

Tell students to work together to stretch the plastic wrap loosely across the top of the container. Tell them to fasten the

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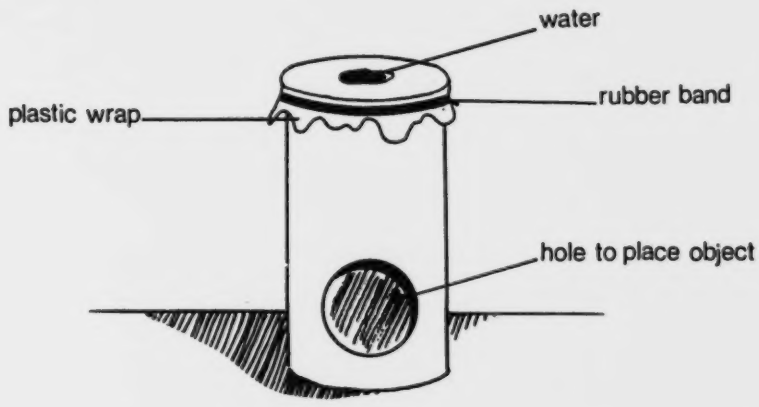
plastic wrap with the rubber band. Now they should do the same thing to their partner's container.



The plastic wrap will form a sort of bowl. Have students fill this bowl with water. Next, have students put whatever they want to look at inside the container. Have students look through the plastic wrap at the object. How is it different? How is it the same? Allow students time to examine other objects.

Evaluation activity

Encourage students to draw pictures of what the objects look like with and without the microscope.

Extension activities

Go on a Nature Walk outside. What can students find to look at with their microscope?

Set several objects at a table in the learning center. Have students use their microscopes to examine.

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Just One of the Gang

A beginning science skill is *classification*. In this lab students group pictures of animals into pet and zoo animals.

Materials per student

Lab sheet (page 58)

Materials per class

Pictures of animals

Preparation

Gather animal pictures. The library, the zoo, or your local pet store are good sources. Hide pictures around the room.

Make copies of the lab sheet (one per student). Cut along the line to separate each sheet in two.

Focusing activity

Ask students where they live. (This is a great time for students to practice remembering their addresses.) Do animals have addresses? Where are some places animals live? Discuss some of the different animal homes.

Procedure for lab

Give each student the two halves of a lab sheet: one with a house, one with a cage. Explain to students that there are a bunch of animals on the loose in the classroom, and you need them to help you get the animals back into their proper homes. Some of the animals live best in a people house, and some live best in the zoo. The students will have to decide which home is best for each animal they find. If they think the animal lives in a people house, they should hold up the paper with the house. If they think the animal lives in a zoo, they should hold up the paper with the cage. Have students practice holding up the correct paper.

Have students stand up with their papers and form a line. Weave around the room, finding the hidden animal pictures. When an animal is found, hold up the picture and ask, "To which group does this animal belong, the one that lives in people houses or the one that lives at the zoo?" Remind students to hold up their answer and not to answer aloud. Ask if anyone knows the name of the animal.

Continue around the room until all the animals are found. Review the pictures, and have students answer by holding up their papers.

Evaluation activity

Have pictures at a learning center for students to classify. Make the activity self-checking by having the answers coded on the back. For instance, put a blue dot on the back of each picture of a pet, and put a red dot on the back of each picture of a zoo animal.

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Extension activities

Have a Pet Day on which students bring their pets to school.

Have students classify the animal pictures in different ways: for example, those that fly and those that do not, those that swim to move and those that do not, those with hair and those without.

Take a field trip to the zoo. Have students look for a specific group of animals, perhaps those with hair or those with hooves.

Use paper grocery bags and make animal costumes and masks. Have an animal parade.

Clothes Encounters

Comb your hair! Wash your face! A lot of attention is given to our exteriors. This lab has students examining the "clothes" that other animals wear.

Materials per lab team of two

Piece of snakeskin / Feather / Shell / Hair or fur / Fish scales / Dish for each different animal covering / Magnifying glass

Materials per class

None

Preparation

Gather a variety of animal coverings. A local pet store may be able to help with snakeskin, feathers, and shells. A pet-grooming shop may be able to provide dog hair. A fish market should be able to save you some fish scales if you ask. Be sure to wash the scales with diluted bleach to avoid a smelly classroom!

Put each sample in a plastic or Styrofoam dish for students to examine.

Focusing activity

Have students use a magnifying glass to look at their own skin. Ask why we have skin. What job does the skin do? Point out that skin is used for protection. It is like a shield.

Procedure for lab

Ask if all animals have skin as we do. What do other animals have on the outside? Allow time for students to answer. Accept all responses.

Explain that scientists often work in teams when experimenting. Today the class will work in lab teams of two students each. Emphasize that students will need to share equipment. They will be examining different coverings animals use for protection.

If possible, allow one student from each lab team to gather the materials the team will need for this lab. When every lab

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team has all necessary materials, students may use a magnifying glass to examine the animal coverings.

Students should compare the coverings. Start discussion by asking how the coverings are different. Differences are easier for students to verbalize. Then ask how the coverings are alike. What colors can students see? What shapes can they identify? Are the coverings soft like human skin, or are they rigid?

Have students classify the animal coverings. Allow them to establish their own classification system.

Evaluation activity

Prepare a bulletin board with labels of different animal coverings (scales, feathers, shells, hair, skin, and so on). Have students bring in pictures of different animals and place them under the correct label.

Extension activities

Do rubbings by placing the animal covering (such as a feather) under a piece of paper. Hold the paper in place, and color over the top. You may want to set up this activity at a learning center. Secure the animal covering to the table so that it will not move during the rubbing process.

Fingerprint the students with an ink pad and paper. Lightly press each student's fingers on the pad and then the paper. Use a face cleanser to remove ink from fingers. Emphasize that even though the skin looks alike on each finger, every finger is different.

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A Balancing Act

The concept *unequal* is stated in simple terms early in a child's life. We have all heard, "His cookie is bigger than mine!" or a variation of that statement. But *equal* and *unequal* are still difficult concepts for young children. A child will look at height and not consider width when determining which of two objects holds more than the other. This lab has students measuring the mass of objects by using paper clips as they explore the terms *equal* and *unequal*.

Materials per lab team of two

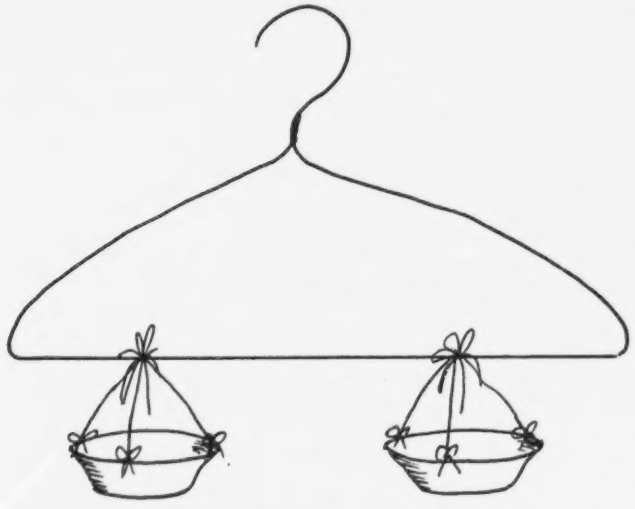
Three feet of string / Two Styrofoam bowls / Coat hanger / Adhesive tape /
Small objects to balance such as a large paper clip, sugar packet, rubber band, penny, playing card, or cap eraser / Twenty paper clips

Materials per class

Marker / Large piece of paper / Glue / Two different pencils / Two pieces of identical paper / Extra paper clips

Preparation

Construct a balance for each lab team. Cut six pieces of string five to six inches long. Poke three small, equally spaced holes in the top of a Styrofoam bowl. Attach it to the string on the hanger, threading one string through each hole. Tie the three strings together at one end. Tie this end to one of the bottom corners of the hanger. Tape to secure it. Repeat for the other side of the hanger, except *do not secure this side with tape*. Position the hanger so that it hangs freely, perhaps from a rod or the edge of a table. Observe to determine if the hanger is balanced. If not, move the string without the tape until the hanger is balanced. Secure the loose string with tape.



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Make a class size chart. Use a marker to divide the paper. Make as many rectangles as there are objects that will be placed on the balance. Glue a sample of each object in a rectangle.

Focusing activity

Hold up two pencils that are of different size. Ask the class if the pencils are equal. How are they different? How are they alike?

Next hold up the two identical pieces of paper. Ask the class if the pieces of paper are equal. How are they alike? How are they different?

Now comes the tough question. Tell the students that they just told you that the pencils were *unequal* and the pieces of paper were *equal*. What do the words *equal* and *unequal* mean? Allow as many students as possible to answer. Students should reach the conclusion that *equal* means *the same as* and *unequal* means *not the same as*.

Procedure for lab

Show students one of the balances. Explain that a balance is similar to a scale. Explain that today students will be working together to make two different objects equal by using the balance.

Demonstrate how to use the balance. Hang the balance so that the students can see it. Point out that the bottom of the hanger is even. It does not look like a slide. That means both bowls hanging down are equal. Place one of the objects you have gathered into the bowl on the *left* (name *left* to help students practice understanding left and right). Have students make observations about the bottom of the hanger. It is no longer even. It looks like a slide. The bowls are not equal. Ask students what could be done to make the bowls equal. Allow the students time to hypothesize. Try some of their suggestions, deciding which make the bowls equal.

Explain that, in lab, students will place paper clips in the bowl on the *right* side until the bowls are equal. Demonstrate, counting aloud as you place the paper clips in the bowl. When the bowls are equal, state how many paper clips it took to equal the object in the bowl on the left.

If possible, have one student from each lab team gather the supplies that the team will need. Tell the students which object you want them to place first in the bowl on the left. When all the teams have finished, ask how many paper clips it took. Do not be surprised if teams get slightly different answers. Explain that objects that look equal may not be equal. Fill in their answers on the class chart under the appropriate object. Continue until the masses of all the objects have been measured.

Evaluation activity

Give each lab team one more object. Tell them to demonstrate the word *equal* using the balance, but do not give directions on

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how to do it. Students should verbalize their findings. How would they demonstrate the word *unequal*?

Extension activities

Set a balance and a variety of objects on a table for the students to explore.

Using blocks, make a structure. Have students make one that is unequal to yours.

Have students line up in two equal lines.

Not an Ounce of Fat

Proper nutrition plays an important role in our lives. The time to start teaching proper nutrition is early. In this lab students will experiment to find which foods contain fat.

Materials per student

One-half of a paper grocery bag / Potato chip / Piece of an apple / Raisin / Shelled peanut / Piece of hot dog / Cube of cheese / Paper plate / Lab sheet (page 59) / One crayon, any color

Materials per class

Two eyedroppers / Vegetable oil / Paper grocery bag / Marker / Water / Soap / Paper towels

Preparation

Cut each grocery bag so that it is a large rectangle. Cut this rectangle in half.

Cut the food into pieces and place the pieces on paper plates.

Duplicate the lab sheet so that each child has a copy.

Focusing activity

Explain to the students that they are going to learn about one of the nutrients in food. Did they know that some foods contain fat? We need to eat some fat. It is what helps to keep us warm, and it gives us energy. Ask what they think would happen if we ate too much fat. Explain that eating too much fat makes our body store too much fat. If our bodies are storing too much fat, our bodies get fat, and our heart has to work harder.

Explain that oil is a fat. Put a drop of oil on the right side of a piece of grocery bag. Label it *Oil*. Put a drop of water on the left side of the grocery bag. Label it *Water*. Have students take turns waving the bag through the air until the water spot has dried. Compare the two spots. Try waving the bag more. Does the oil spot change? Explain that fat leaves a spot on paper. This is one test that we can do to see if there is fat in a food.

Have students wash their hands to remove any natural oil.

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Procedure for lab

Depending on your class, have each student gather a piece of grocery bag, a plate of food, a lab sheet, and one crayon. Tell students to choose a food to test. Rub it on the paper bag. Wave the bag through the air. It is important that they allow enough time for any water to evaporate. You may wish to do each item together so that you can control the pace. Does the food contain fat? Students should then look at their lab sheet. Direct them to find the picture of the food they just tested. If the food contains oil, they should mark an X across the picture. If it does not contain oil, they should not put any mark on the picture. Have students repeat the procedure for each food.

Evaluation activity

The lab sheets should be collected and reviewed.

Extension activities

Make a list of words that rhyme with *fat*.

Have students bring packaging labels from home. Look at the nutrition information. Does the food contain fat?

Start a nutrition unit. Encourage children to eat properly. Invite a pediatrician or nutritionist to speak to the class.

Set up a Fat-Testing Station at a learning center. Have pieces of grocery bags and pieces of food for testing.

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Are You Listening to Me?

We often take our sense of hearing for granted. In this lab students will review the five senses and then use their sense of hearing to locate an object in the room.

Materials per student None

Materials per class Small radio, tape player, or music box

Preparation None

Focusing activity Review the senses. Ask students what part of their body allows them to see. Taste? Smell? Touch? To this last question, students will probably respond, "Hands." Ask if the only place they can feel is on their hands. Tickle a student on the back of the neck. Could the student feel it? It's not just our hands that bring us information through the sense of touch; it's our whole skin. Ask if anyone remembers the last sense. If no one remembers, ask students if they *heard* the question. Tell them you didn't *hear* the answer. If no one makes the connection between what you said and the sense of hearing, tell students that the last sense is that of hearing. Ask what part of the body helps them to hear.

Procedure for lab Explain that in lab today, students will be using their sense of hearing to locate a missing radio in the classroom. Invite one student to leave the classroom while another student hides the radio. Be sure the radio volume is on medium to medium soft. After the radio is hidden, invite the student to come back into the classroom and find the radio. Remind the other students to observe quietly, but expect a few slipups! If after sufficient time the radio has not been located, have the student who hid the radio retrieve it.

Discuss how our ears help us to identify sounds and to pinpoint location. Why is this important?

Repeat this activity with different students until everyone has had an opportunity to participate.

Evaluation activity Go on a Listening Walk. How many sounds can students identify? Where is any particular sound coming from?

Extension activities Sit students in a circle. Blindfold one child, and sit the child down in the center. Have another student ring a bell. The blindfolded student should point in the direction of the sound.

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Have students listen to music. Encourage them to use creative movement to show how the music makes them feel.

Play a commercial or homemade tape that has different sounds on it. How many sounds can students identify?

A Magnetic Personality

Look at the refrigerator of anyone who has children, and you'll see evidence of children's "attraction" to magnets. Capitalize on it with this lab that will have students wanting to "stick" with science!

Materials per lab team of two

Miscellaneous objects to test. Teams may have the same objects so that answers can be compared and challenged, or teams may have different objects to expand the total number being tested. Some ideas are a pencil (tricky!), a paper clip, an eraser, paper, a magnet, aluminum foil, a rubber band, a soda pop can, a nickel, and a safety pin. /
Container to hold objects / Magnet / Tray (optional) /
Lab sheet (page 60)

Materials per class

None

Preparation

This lab requires very little preparation. Materials can be set up on a tray for each lab group, or left together to require students to practice gathering their own materials.

Duplicate the lab sheet for each lab team. Cut along the black line so that each team will have one complete set: a sheet that is labeled *Attracts* and one that is labeled *Repels*.

Focusing activity

Ask, "What's a magnet?" This will allow students to practice their oral communication skills as they try to tell you. Repeat one or two general characteristics that they give, such as "It sticks to things."

Have students use creative movement to demonstrate how a magnet is attracted to some objects. Explain to the students that they are magnets and they are attracted to their chairs (oh, don't we wish it were true sometimes?). How would they show you? Does a magnet stick to everything? If students were magnets, how would they act if they were magnets that were not attracted to their chairs (they would act normal, right?)?

Procedure for lab

After students have received their supplies, explain to the students that they are going to experiment with the objects they

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see and classify them into two groups, those that will stick to a magnet and those that will not. Ask students how they will be able to test an object to observe if it is magnetic or not. Go over the procedure for the lab (*choose an object* to test, *hypothesize* if it will stick or not stick to the magnet, *test* the object, and *classify* the object by placing it on the correct piece of paper).

This is a good lab in which to have students progress at their own speed while you circulate among lab teams. Ask students why one object is *magnetic* (don't be afraid to use the correct terms) and another is not.

When everyone has finished, compare the results. Did everyone get the same results? If there is any disagreement among students, have lab teams retest the object. Discuss why some objects are attracted to a magnet and others are not. Help students to understand that what an object is made from (steel, iron, and a few other metals) determines if it is attracted to a magnet.

Evaluation activity

Have students bring one item from home that is attracted to a magnet and one that is not.

Extension activities

Go on a scavenger hunt around the room to find what items a magnet is attracted to.

Set up a learning center that has different items for students to classify as magnetic and nonmagnetic.

Have students "fish." Cut out small construction-paper fish. Attach a paper clip to each fish. Put fish in a pond (pail). Tie a string around the end of a dowel. Attach a magnet to the other end of the string to complete the fishing pole. This activity will help to increase hand-eye coordination.

At a learning center set up a variety of magnets (horseshoe, circular, bar) for students to examine.

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The Eyes Have It

"Please, tell us exactly what you saw." That line appears not only in television police shows but in the science lab as well. It is never too early to work on developing observational skills.

Materials per student

None

Materials per class

Colored chalk, markers, or crayons /
Chalkboard or large pieces of paper

Preparation

Set up an area where a student can stand or sit without being seen by the rest of the class.

Focusing activity

Stand in front of the class and ask students to describe you. Be forewarned: students can be *very honest*! Prompt them into making as complete an observation as possible. For example, if a student says you are wearing slacks, ask what color. Do the slacks have pockets? How many? Where are the pockets located? Encourage students to make as many observations as possible.

Procedure for lab

Explain to the students that they were *observing* you. When they said you were wearing slacks, they were making *observations*. Observing is an important part of a scientist's job. Since they are scientists, it is important that they make *accurate observations*. Do not be afraid to use correct scientific terms. These are the same students who can correctly identify and pronounce every type of dinosaur known!

Tell the students that they are going to play a game to see how observant they are. Explain that one student will disappear from sight, and the students left will have to describe the missing student, just as they described you. The only difference is that they were able to see you while reporting their observations. They will not be able to see the student.

Choose a student to walk in front of the class, take a bow (to allow the class to make observations), and then go to an area in the room that cannot be seen by others.

As students give observations, draw their responses on the board or on a large piece of paper so that a visual comparison can be made when the student reappears. If you draw the students' observations, omissions will be obvious, and repetition in observations will be reduced. When students have remembered as much as possible, invite the missing student to stand beside the drawing. Compare. How many observations were correct? Write down the number.

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Evaluation activity

Allow any student who wishes the opportunity to be the missing student. Each time encourage the class to get more observations correct.

Extension activities

Place a simple object, such as a pencil holder, and a cassette tape recorder at a table. Have students take turns describing the object into the recorder. Because students love to hear themselves, observations will become more detailed.

Play I Am Thinking of an Object, a game in which students have to observe carefully. Have students take turns. One student silently chooses an object visible in the room and gives one observation about the object at a time to the class. Can students guess the object being described?

Praise observations that are made around the classroom. Periodically make a change in the room, perhaps a new bulletin board. How long does it take students to observe the change?

A Seedy Character

Where do we find seeds? How will your students respond to this question? Before the lab, they may respond that we find seeds in packages at the store. After the lab, they will respond that seeds come from plants.

Materials per student

Newspaper to cover lab area / Fruit or vegetable / Drawing paper / Crayons or markers / Plastic knife / White dessert-size paper plates / Paper towel

Materials per class

None

Preparation

Send a note home requesting that each child bring a raw fruit or vegetable to class for a study of seeds. Be sure to specify the day the item must be in!

This lab lends itself nicely to the use of Science Assistants. Ask for older students or parents to assist.

Focusing activity

Ask students to *hypothesize* where seeds come from. Students may need to be told that a hypothesis is an educated guess. Accept all answers without commenting if they are right or wrong. Explain that in today's lab students will become detectives and try to find the missing seeds. Before students start the investigation, they should draw a picture of the fruit or vegetable they are investigating.

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Procedure for lab

Have each student cut the fruit or vegetable they brought in half. This is an excellent time to talk about the concept of *fractions* and the term *half*. What do they find?

As seeds are uncovered, have students remove the seeds from the fruit or vegetable and place them on a paper plate.

Help students make observations about the seeds by asking, "What is the size of the seed? Are all the seeds in the fruit or vegetable the same? What color is the seed? What shape is the seed? What is the texture of the seed?" Circulate among the students as they are making observations. Each student should put his or her plant picture with the seeds.

Have students sit in a circle with their plate of seeds and their picture. Students should share their findings with classmates. Discuss which fruit or vegetable had the most seeds. Which had the biggest seeds? Which fruit or vegetable had the smallest seeds? Are all the seeds the same shape? Are the seeds the same color?

Evaluation activity

After all the seeds have been observed, ask again where seeds come from. Where did students find seeds today?

Extension activities

Use the drawings made by the students to create a Ten Most Wanted bulletin board of fruits and vegetables. You could even take a class poll and graph the results.

Put the plates of seeds on the learning table for students to observe and compare. Have two or three magnifying glasses handy to use for observing closely.

Make seed pictures to illustrate a variety of seed types and colors.

Plant the seeds that were discovered. Does anyone in the class have a *green thumb* (that figure of speech will take some explaining as the students look at their thumbs!)?

Use the fruits and vegetables to do art printing. Students should dip the end of the fruit or vegetable into paint and then press it onto paper. Encourage students to make several prints before getting more paint.

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Show Us Those Pearly Whites!

Studies have shown that the earlier children practice good dental health and see a dentist, the fewer cavities they will have. In this lab, students will discover items that are good for teeth, and also some that are not.

Materials per student

Lab sheet (page 61)

Materials per class

Feely Box (see *Preparation*, below) /
Items to go inside box, such as gum (regular and sugar-free), a toothbrush, toothpaste (with and without the Dental Seal of Approval), floss, hard candy, apple, carrot, a picture of a dentist, a picture of milk, a candy bar, a pencil (how many people that you know place nonfood items in their mouths?), and raisins (good only if teeth can be brushed immediately after eating)

Preparation

Before class you will need to construct a Feely Box. Just cut off the top of a half-gallon carton from orange juice or milk. Next take an old sock (clean, please!) and cut the foot off, leaving the portion that goes over the ankle and up the leg. Tape it securely to the top of the container with brightly colored tape. Cover the container with self-adhesive paper.

Reproduce a *Sad* tooth/*Happy* tooth lab sheet for each student. Cut the sheet along the straight line in the middle.

Focusing activity

Ask students if they know what is inside their mouths. "Tongue" and "teeth" should be two responses that you hear (or perhaps you'll have someone say "gum" or "candy"!). Ask why we have teeth. Students will probably answer that teeth are important for chewing. Point out that teeth are also important for talking.

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Procedure for lab

Discuss why it is important to take good care of our teeth. Explain that there are items that are good for teeth and items that are bad. Tell students that they are going to play a game to see if they can figure out which items are good and which are bad.

Hand out the *Sad* tooth/*Happy* tooth papers. Explain that if you hold up an item that students think is good for their teeth, they should hold up the *Happy* tooth. Have students practice this now so that you can check comprehension. If you hold up an item they think is bad for their teeth, they should hold up the *Sad* tooth. Again check comprehension.

Reach into the Feely Box, select an item, and hold it up. Wait for the students to hold up their *Happy* tooth or *Sad* tooth sheets in response, and then discuss the item. Continue the procedure until the students have seen and discussed all the items from the Feely Box.

Evaluation activity

Have students bring in pictures of items that are good for teeth and some that are bad. Use the pictures to make a bulletin board display. Allow students to place the pictures in the correct category.

Extension activities

Invite a dentist or dental hygienist into the classroom to show proper brushing techniques to the students. Often a dentist will bring along free samples.

Set the Feely Box at a table with a Mystery Item inside. Have students reach inside and guess what the object is. Have the object pertain to dental health.

Place a mirror on a table to encourage students to look at the different shapes of their teeth.

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Food for Thought

Birds of a feather will flock to your trees with this lab. Students will not only be testing which food birds prefer (by giving the birds a sort of taster's choice test!), but they will also be doing simple math to graph the results. Up, up, and away!

Materials per student

Safety needle / String, approximately one yard / Index card / Self-sealing plastic sandwich bag / Five pieces of dried fruit / Five peanuts in shell / Five pieces of stale popcorn

In one week:
Lab sheet (page 62) / Five paper clips /
Dot stickers, three different colors

Materials per class

Tape / Paper punch /
Construction paper circles, five circles each of three different colors

Preparation

Thread the safety needles with the string. Tie the needle on the thread so that the needle cannot slip off.

Write each student's name on an index card. Place it in a plastic bag, and seal the bag. Punch a hole in it with a paper punch.

Duplicate the lab sheet so that each student has one. Write the date and students' names on the sheet if necessary.

Cut out construction-paper circles for the demonstration graph.

Focusing activity

Take the children on a Bird Walk. Have them sit quietly for five minutes (okay, okay, how about three?) and listen for sounds birds make. How many can the students hear? Which direction is the sound coming from? Can they see any birds? What are the birds doing? Is there any other evidence that birds live near? Look for bird prints in the damp ground. Investigate trees for nests. Hunt for feathers.

Procedure for lab

Ask the class what they think a bird eats. Make a picture list of the items they name. Ask how they could find out what birds eat. Listen as they design experiments. Explain that they are going to conduct an experiment to see what foods the birds around the school like.

Tell students that they will be using a needle today, so they must be very careful. Have each student gather the supplies. This will reinforce counting to five and one-to-one correspondence. Spot-check students to make sure they have five pieces of each food they are testing.

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Have students tie the plastic bag on their garland first so that they will be able to identify it. Allow students to be creative in their placement of the food on the string. After everyone has finished making a garland, go outside and tie the garlands to trees. Tie each end to a branch, allowing the garland to hang down. This will deter other creatures from eating the food.

After one week, gather the garlands. On the board draw a graph like the one on the students' lab sheet. Hand out a lab sheet and five paper clips to each student. Tell students to use the paper clips to show how many pieces of dried fruit they put on the string. Have students look at their garland. How many pieces of dried fruit are left? Have students take that many paper clips away from the row of five. For example, if there are two pieces of dried fruit on the garland, they should take two paper clips away, leaving three. Ask how many paper clips are left. This will tell them how many pieces of dried fruit the birds ate.

Direct students' attention to the board. Point to the column for *Dried Fruit*. Tell them that you have three paper clips left, so the birds must have eaten three pieces of dried fruit. The squares on the board will help to show how many pieces the birds ate. Take three circles of one color and put one in each square in the *Dried Fruit* column, starting at the bottom and going up. Explain that each circle fits into one square. Ask how many pieces of dried fruit the birds ate. How many circles are on your graph?

Have students find *Dried Fruit* on their lab sheet. They should put one sticker in the *Dried Fruit* column for each paper clip they have left.

Have students go through the same procedure for the peanuts and popcorn, using a different color for each. Demonstrate each time, if necessary.

Have students look at the graphs they just made. Which column is taller? Which food did the birds like the best?

Evaluation activity

Students should be able to verbalize which food the birds liked the best by looking at their graph.

Extension activities

Carry out one of the experiments the students designed during class. Compare the results.

Do a class graph. Combine the results from each student.

Have the students make garlands to test at home. Are the results the same?

Make a variety of bird feeders. Roll a pinecone in peanut butter that has honey stirred in (to make it easier for the birds to swallow) and then in birdseed. Use a string to hang the pinecone from a tree. Cut an opening in a plastic milk con-

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tainer. Fill the container with food. Put holes in the side, and hang it from the tree.

Set out a bird identification book. How many birds can students identify?

Have students use creative movement to move like a bird.

Visit a pet store to look at the birds. How does the diet of these birds differ from the diet of birds in the wild?

All Mixed Up

Color this lab a big success for getting students to explore how colors are made! Upon completion of the lab, students will not be mixed up on where the secondary colors come from!

Materials per student

Newspapers / Red, yellow, and blue tempera paint / Lab sheet (page 63) / Smock / Paintbrush / Scrap paper / Piece of white paper

Materials per class

None

Preparation

Cover the work area with newspapers.

Hide all the tempera paint that is not red, yellow, or blue in a place where students won't see it.

Duplicate enough lab sheets so that each student has one. Write the date and students' names on the sheets if necessary.

Focusing activity

Explain to the students that they are going to do a wonderful art activity. Go to where you normally store the paint, and act surprised when all you find is red, yellow, and blue. Ask the students what they think you should do. Explore some of the options they suggest. If no one suggests that the paint could be mixed, ask how you might get more colors. State that maybe they could become *chemists* and *experiment* with the colors you have to see if they can create more.

Procedure for lab

Have each student put on an art smock to protect clothing. If smocks are not available, men's short-sleeved shirts worn backward work well. Distribute the brushes and the red, yellow, and blue paint as you normally would for an art project. Give each student a lab sheet, scrap paper, and the sheet of white paper. The scrap paper is to be used as a place marker on their lab sheet. Have students position their scrap piece of paper on their lab sheet so that just the top row of circles is showing. Explain that the other sheet of paper will be their

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work space. On this sheet of paper they will create any new colors.

Have students put a small amount of red paint on the white paper. Since they may be creating colors, it is important that they keep track of their creations. Have them use the red paint to color in the first circle in row one of their lab sheet. This is the first color they will be using. The second color they will use is blue. Have students put a small amount of blue paint on their work paper. It should be close to the red paint already on the paper. Have them use the blue paint to color in the middle circle on the first row of their lab sheet. Ask how you might get a new color from red and blue. When someone suggests that the colors could be mixed, have the students try it. Act surprised when the color purple appears. Color the last circle on this row with the new color.

Repeat for the second row of circles. This time use the colors yellow and red. Use yellow and blue for the third row of circles. Allow students to experiment on their own for row four. Have the students share their findings, especially row four.

Evaluation activity

Have students paint a picture using only red, blue, and yellow paint. Do they combine the colors to get the spectrum, or do they keep the colors separate?

Extension activities

Explore to find if the same colors are produced with red, yellow, and blue light. Cover powerful flashlights with red, yellow, and blue cellophane. Darken the room. Shine two of the cellophane-covered flashlights on the same place of a sheet of white paper at the front of the room where everyone can observe the results.

Place a prism in front of a powerful light source, such as a slide projector. Can students find the spectrum created when white light is bent? What is the order of the colors? (ROY G. BIV is the mnemonic for red, orange, yellow, green, blue, indigo, and violet.)

Repeat the experiment with a different type of paint. Are the results the same?

Read the book *Little Blue and Little Yellow* by Leo Lionni (Astor Press, 1959).

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You Rub Me the Wrong Way!

Sometimes we regard friction as an ally; other times it creates nothing but trouble. In this introduction to friction students will learn "firsthand" just what friction is, what increases friction, and what reduces it.

Materials per student

Two pieces of waxed paper, approximately five inches square /
Two pieces of coarse sandpaper, approximately five inches square

Materials per class

Baby oil / Variety of shoes

Preparation

None

Focusing activity

Give each student two pieces of waxed paper. Tell students to place the waxed paper between their hands. Tell students to slide their hands in opposite directions, with their fingers touching and their palms apart. Do the pieces of waxed paper slide easily?

Have them repeat the procedure using two pieces of coarse sandpaper. Do the pieces of sandpaper slide easily? How was sliding the sandpaper different from sliding the waxed paper?

Procedure for lab

What makes objects not slide easily? Have students place the palms of their hands together. Instruct them to begin rubbing their hands together. After about a minute, ask students to observe any changes that they feel. How do their hands feel? What is making their hands feel hot? Give students the opportunity to respond.

Explain that they are feeling *friction*. Friction happens when two objects rub together. Friction makes heat. When the pieces of sandpaper rubbed together, there was friction. When the pieces of waxed paper rubbed together, there was also friction. What do they think would happen if there were a lot of friction? What have they used today that made a lot of friction?

What could they do that would reduce the friction or make the friction less? Remind students of the focusing activity that they did. What made the waxed paper have less friction than the sandpaper? Students should relate that the waxed paper was smoother. Explain that the smoother the surfaces being rubbed together, the less friction is created. How could we make our hands smoother?

Have students once again begin rubbing the palms of their hands together. Circulate among the students, adding one or

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two drops of baby oil to the palms of their hands. Have students rub their hands together and compare the results. What made it easier to rub their hands together? The oil *lubricated* their hands. It made them smoother so there was less friction and their hands could slide more easily.

Review that friction always occurs when two objects rub against each other. Ask when friction is the greatest. When is friction the least? What can be done to reduce friction?

Evaluation activity

Bring out a variety of shoes, especially those used in sports. Be sure the shoes have a diversity of soles. Some good samples to have available are ballet shoes, golf shoes, football shoes, boots, and dress shoes. Have students classify the shoes into ones that would cause a lot of friction when worn and those that would cause little friction when worn.

Extension activities

Discuss when friction is a good thing in a car (in brakes, for example) and when it is a bad thing (in an engine).

Create a ramp for a model car to go down. Observe the car when a piece of waxed paper is placed on the ramp. Repeat the experiment with a piece of sandpaper. Have students experiment using other coverings for the ramp.

Have students go down a metal slide. After each has had a turn, rub the surface area with a piece of waxed paper. Now have students go down. You may wish to be standing at the bottom to catch any student who becomes airborne! Discuss what made the difference. Be sure to use the word *friction*!

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You Scream, I Scream . . .

What better way to experience change of state than with the making of ice cream? During this lab, students will observe a liquid (milk) changing into a solid, and a solid (ice) changing into a liquid. What makes this lab even better is that the students will be able to eat the results! *Note*: If you have students in class with a milk allergy, substitute fruit juice for the milk and sugar.

Materials per student

Clean, empty soda pop can / Plastic container /
Crushed ice / One cup salt / Sandwich-size plastic bag /
Measuring cup / One-half cup milk / Measuring spoons /
One tablespoon sugar /
One tablespoon sweetened, condensed milk /
Plastic spoon / Ice cube / Dish

Materials per class

Extra cans / Bottle opener / Dish soap /
Food processor or other tool for crushing ice /
Food coloring / Glass of water / Hand soap /
Paper towels / Empty glass /
Two clear, empty containers that are shaped differently /
Ball / Box / Clear plastic bag /
Extracts (vanilla, banana, orange, and so on) /
Chocolate syrup

Preparation

Send a note home requesting each child to bring to class an empty, clean soda pop can that has had the top removed. Be prepared for cans that neither are clean nor have the top removed! Have some extra cans, a bottle opener, and dish soap close at hand. The bottle opener works best at removing the top of the can, which must be pried off. Also request that each student bring in a plastic container such as one that held frozen whipped cream or butter. A large cottage cheese container will also work.

Crush ice before the lab. A food processor crushes ice nicely, but somewhat noisily, for this lab. Be forewarned: crushed ice is very cold!

Use two or three drops of food coloring to tint the water in the glass for easier viewing.

Have students wash their hands before beginning this lab.

Focusing activity

Hold up a glass of water for the class to see. Ask the class what you are holding. After the students have identified it as a glass of water, pour the water into the empty glass. Ask what shape the water is in. Pour it into a container of another shape. What

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shape is the water now? Do it a third time. What shape is the water now?

Ask what shape water is. Water is whatever shape the container holding it is. Water is a liquid. It becomes the shape of the container. How many other liquids can students name? How do they know these things are liquids?

Hold up a ball. Ask if it is a liquid. How do they know? Allow students time to respond to this question so that the characteristics of a liquid are repeated. Ask what shape the ball is. Put the ball inside a box. Did the ball change shape? Put the ball inside the plastic bag. Did the ball change shape? If a ball is not a liquid, what could it be? (*Suggestion:* Introduce gas as a state of matter using the lab *More Than Meets the Eye*, page 1.) Once again, if no one states that a ball is a solid after several examples, state that a ball is a solid. It cannot be poured. What other solids can students name?

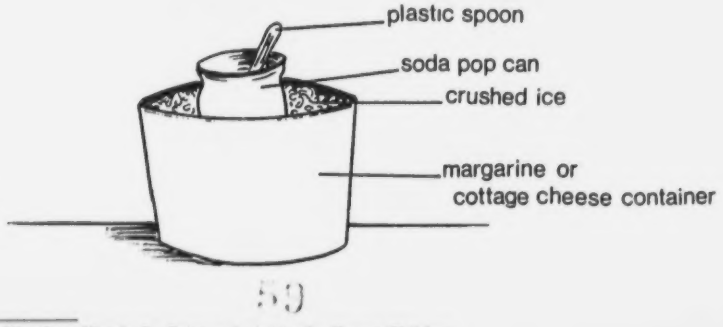
Procedure for lab

Explain to students that if they listen closely and follow directions, they are going to see some magic performed right before their eyes!

Have students pour some salt in the bottom of their plastic container. Ask if salt is a solid or a liquid. Have students set the soda pop can (open end up) on top of the salt they just poured in. The can should sit in the middle of the plastic container.

Have students layer ice (ask if the ice is a solid or a liquid) and salt around the soda pop can, being careful not to get any ice or salt inside the can. If necessary, have students put a plastic bag over the can opening. Students should put as many layers of ice and salt as the plastic container will hold. This will hasten freezing.

Next have students measure one-half cup of milk and pour it into their soda pop can. Ask if the milk is a liquid or a solid. How do they know? Students should measure and add one tablespoon of sugar to the milk. Again ask if the sugar is a liquid or a solid. When the students have completed this, have them measure and add one tablespoon of sweetened, condensed milk (not evaporated milk) to the soda pop can. Is this milk also a liquid? If any extract or chocolate is desired, it should be added now. A small amount goes a long way!



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Ask what is outside the can. Is it a solid or a liquid? Is the mixture inside the soda pop can a solid or a liquid?

Have students use the plastic spoon to stir the mixture. They should scrape the mixture from the side of the can often because this will cause the mixture to freeze faster. The mixture will reach the consistency of a thick shake in about ten minutes. Excitement will build as the students see the mixture thicken before their eyes, especially when they figure out they are making ice cream.

Discuss what is happening to the ice and salt mixture. They should see that it is changing from a solid to a liquid, while the mixture inside the can is changing from a liquid to a solid.

Have students hypothesize as to what they think the mixture inside the can is. Have them taste it. Stress that they should never taste anything without permission from an adult. "Hooray," they scream, "it's ice cream!"

Evaluation activity

Place an ice cube in a dish in front of each student. Have the students draw what the ice cube will look like at the end of the day. Then test it out!

Extension activities

Have the students place a thermometer in the ice and salt mixture. What happens to the red indicator during the experiment?

Visit a local ice cream parlor that makes its own ice cream.

At a learning center, set up pictures of solids and liquids for the students to classify. Make the activity self-checking by placing one color dot on the back of each liquid and another color dot on the back of each solid.

Make a class graph of favorite flavors of ice cream.

Start a unit on nutrition. In which food group does ice cream belong?

Where does ice cream come from? Have a card with a picture of each step. Have children put the cards in the correct order.

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Nature's Apartment Houses

Trees provide us with shade, wood, and beauty. But trees do more. They also provide homes from their basement roots to their treetop penthouses. This lab has students exploring trees to meet the tenants.

Materials per student

Lab sheets (pages 64 and 65) / Empty toilet paper roll / Construction paper / Scissors / Tape or glue / Crayons / White paper

Materials per lab team of two

Tree / Trowel / Magnifying glass / Binoculars (optional)

Preparation

Duplicate the lab sheets so that there is a copy of each for each student.

Ask students to bring in empty toilet paper tubes. As an art activity have each student cover a tube with construction paper. Allow students to decorate the tubes. They have just made Bug Finders. The tubes narrow the students' range of vision and help them concentrate on small areas.

Focusing activity

Have each student draw a picture of his or her home. Display the pictures, and discuss the different kinds of homes people have. Be sure to include apartment houses in the list.

Procedure for lab

Ask students if animals live in the same type of homes as people. Expect some students to respond that cats and dogs do! Discuss where animals live.

Ask students what an *apartment house* is. Allow students time to list characteristics of an apartment house. Explain that some animals live in apartment houses, apartment houses built by nature. Ask if the students can think of something in nature that has a *basement*. If you live where there are no basements, you may have to explain that a basement is part of a building that is underground. Not only does this apartment house in nature have a basement, it also has a *penthouse*, which is an apartment high in the sky. Allow time for students to hypothesize. What is the basement of a tree? What is the penthouse? What parts make up the floors between?

Explain to the children that you are going to take them outside to nature's apartment houses. They will work in teams of two to discover who lives in the basement, the penthouse, and the floors in the middle. Remind students that these apartment houses are living and to treat them carefully. They should not hurt the tenants that use the trees as their home, just as

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the students would not want anyone destroying their home or hurting them! Students have a trowel, their Bug Finders, and a magnifying glass to help them.

If possible, assign each lab team a different tree to explore. Have them observe carefully and discuss what they find with each other.

Evaluation activity

Have students cut apart the animal pictures on the *Apartment Dwellers* lab sheet. Have them tape the *Nature's Apartment House* tree picture in the spot where the animal was found. If they did not see all the animals pictured, do some group investigating to determine where the animals would be on the tree.

Extension activities

At a learning center have students sort and classify pictures of the animals they found according to the number of legs each has.

Some animals change a great deal during their life cycle. Have pictures of the different stages for children to sort and sequence. Make the activity self-checking by color-coding and numbering the back of each picture.

What other homes do animals have? Have students choose their favorite wild animal and discover where it lives. Make a bulletin board display of their findings.

Have students compare their findings. Do some trees have vacancies? Is there a favorite apartment house?

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Down to Earth!

Bring students down to earth as they investigate earthworms! This lab has students carefully observing an important member of the animal kingdom.

Materials per student

Lab sheet (page 66) / Earthworm / Newspapers to cover lab area / Moist paper towel / Water / Ribbon / Marker / Scissors / Ruler / Magnifying glass (optional)

Materials per class

Shovel / Large container / Water / Rich soil / Sand / Wet leaves / Tape (optional)

Preparation

Duplicate the lab sheet so that each student can have a copy.

Focusing activity

Involve students in the collection of the worms. Where should they look? Go on a Worm Scavenger Hunt. Take a shovel and a container full of damp, rich soil mixed with a little sand. Add some wet leaves to the top. Some good places to explore are in a garden (be careful here!), under rocks, and under logs. If your area seems barren, make this a parent-child scavenger hunt. If all else fails, visit your local bait shop!

Procedure for lab

Cover each student's area with newspapers. Give each student a moist paper towel since earthworms need to be kept moist. Allow time for observation. Don't be surprised if initially students say, "Oh, yuck!" and later ask to take their new pet home! Continually stress that students handle the earthworms carefully as earthworms are living organisms that should be treated with respect. Ask if the earthworm is all the same color. Can students tell the head from the tail? Is the earthworm completely smooth? Can they count the rings? Does the earthworm have a top side and a bottom side? Can you tell earthworms apart? Does an earthworm have eyes? A nose? A mouth?

Have students measure their earthworm. Place one end of the ribbon at one end of the earthworm. Students should use the marker to draw a line on the ribbon where the other end of the earthworm is found. Have students pick the ribbon up and cut it at the mark. (Fewer earthworms are "lost" or "multiplied" this way!) This is how long their earthworm is. Have students lay the ribbon on a ruler. How long is their earthworm to the nearest centimeter (a better unit of measure to use than the inch since its markings are more frequent)? Remember to return earthworms to their homes in nature.

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Evaluation activity

Have students complete the lab sheet. They should draw a picture of their earthworm on the top half. Encourage them to color it in. On the bottom students can either tape their ribbon in the rectangle or lay it beside the rectangle and color the rectangle so that it matches the ribbon.

Extension activities

Set up a home for the earthworms. Use a large glass container such as an aquarium. Cover the sides with black construction paper. Put garden soil mixed with sand in the bottom. Put wet leaves and grass on top. Make the dirt deep enough to allow the earthworms to tunnel. Don't overcrowd! Earthworms need space. After several weeks remove the dark cover, and examine the tunnels. Never leave the container in the sunlight or near a heat source! Keep soil moist, but not wet.

What kind of food does the earthworm prefer? Have students gather several different leaves. Place each on top of the soil, and cover it with more soil. After a few days see which leaf is gone.

Do earthworms like moist or dry environments? Put a moist paper towel on one side of a shoe box, a dry one on the other. Place the earthworm in the center. Put on the lid. Wait one minute. Take the top off and find which paper towel the earthworm prefers.

Make "worms" out of small pompom balls glued in a line on a strip of tagboard. Attach small wooden sticks under the first and last pompom to help the worm inch along!

Are all earthworms the same length? Have students compare the lengths of their earthworms. Make a class graph using the ribbons students have cut.

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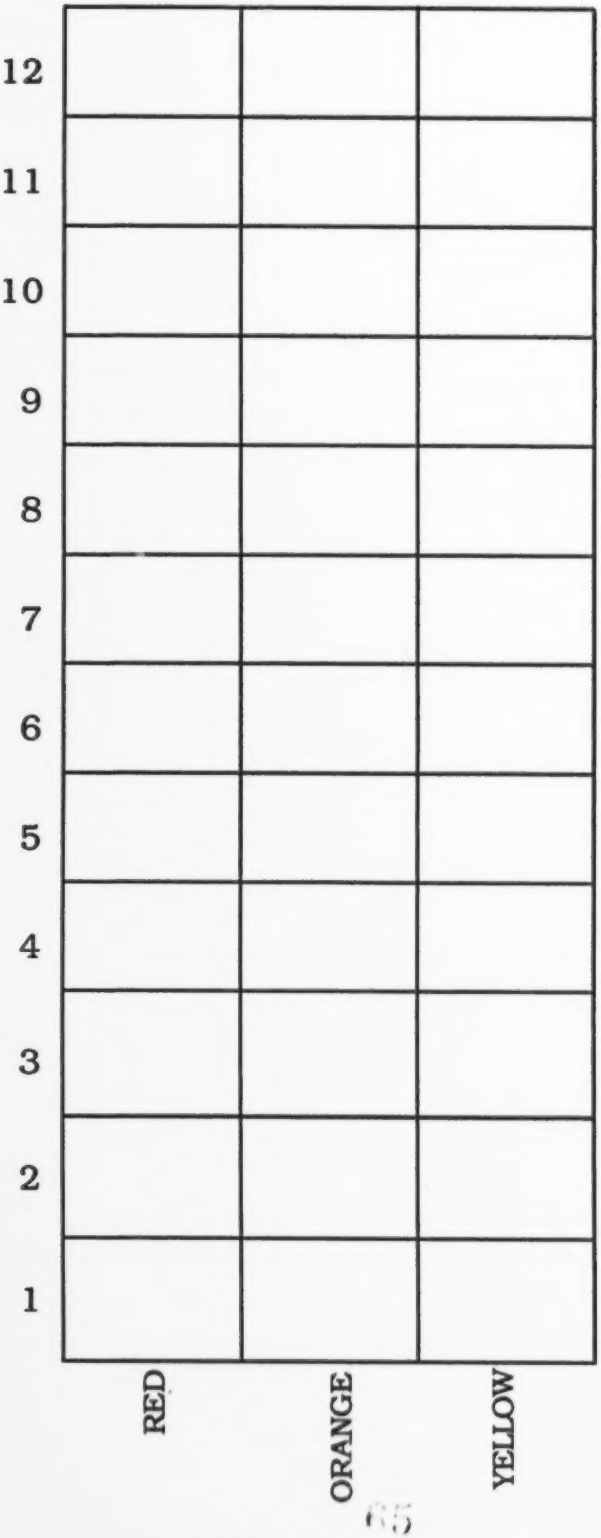
Date **Name**

How many Fruit Loops I can hold in my hand.



Quite a Handful! p. 6

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COLD

67

HOT

66

Hocus Pocus! p. 9

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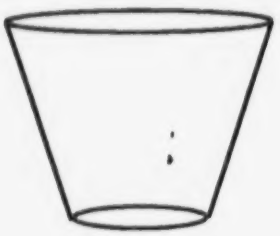
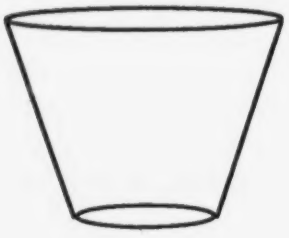
Date **Name**

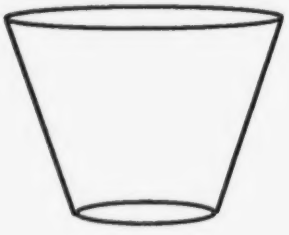
Day 1



Day 8



Day 15



Rain, Rain, Go Away! p. 11

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FLOAT

Buoy, Oh, Buoy p. 13

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SINK

Date **Name**

What the seed looked like when I planted it.

What I think will come out of the seed.

What I saw come out of the seed.

What's in There? p. 16

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I'm Thirsty! p. 18

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BEFORE

AFTER

PET

ZOO

Just One of the Gang p. 24

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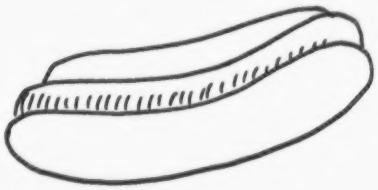
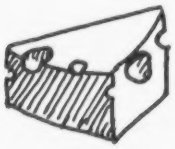
Date **Name**

Which foods have FAT?

Potato chip	Apple
Raisin	Shelled peanut
 Hot dog	 Cheese

Not an Ounce of Fat p. 29

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ATTRACTS

A Magnetic Personality p. 32

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REPELS

HAPPY

SAD

Show Us Those Pearly Whites! p. 37

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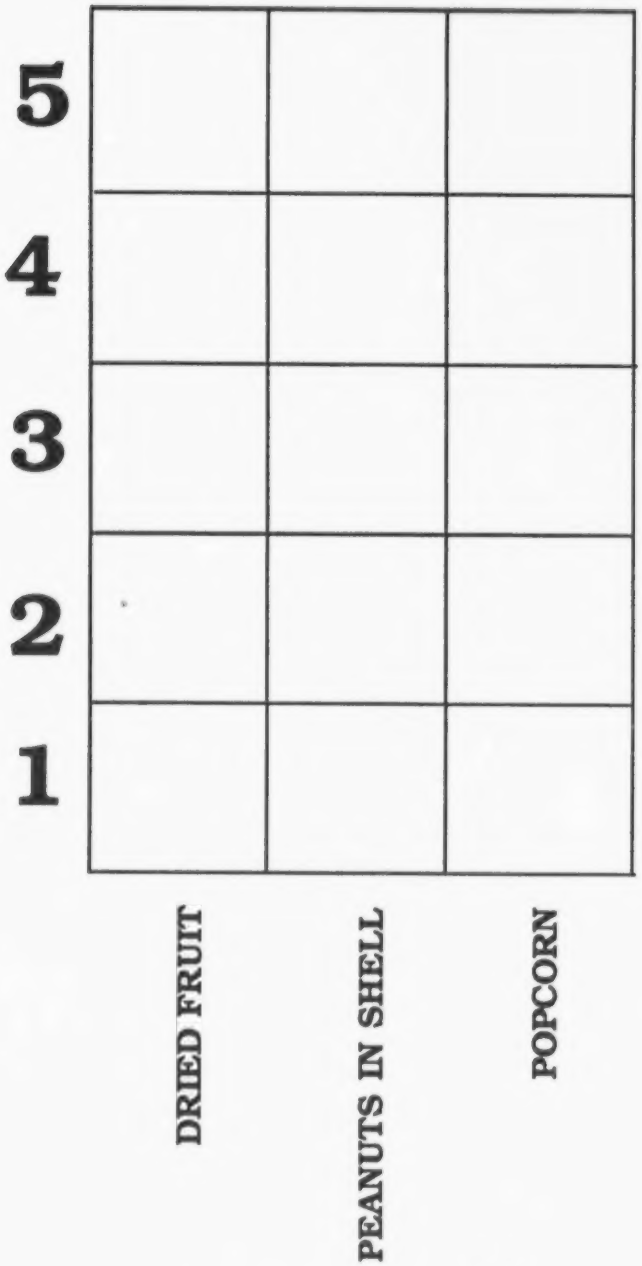
Date **Name**

FOOD BIRDS LIKE



Food for Thought p. 39

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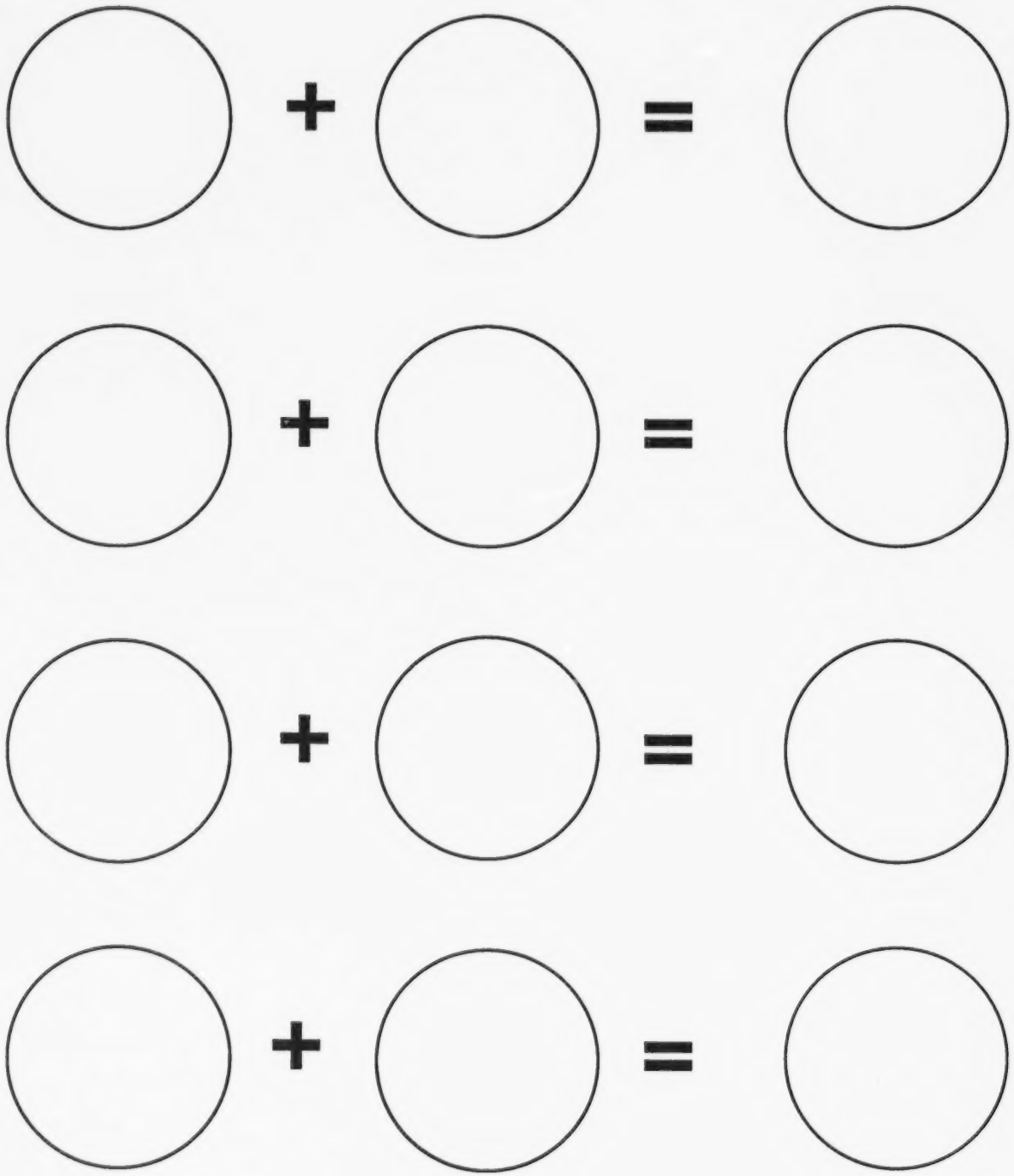

All Mixed Up p. 41

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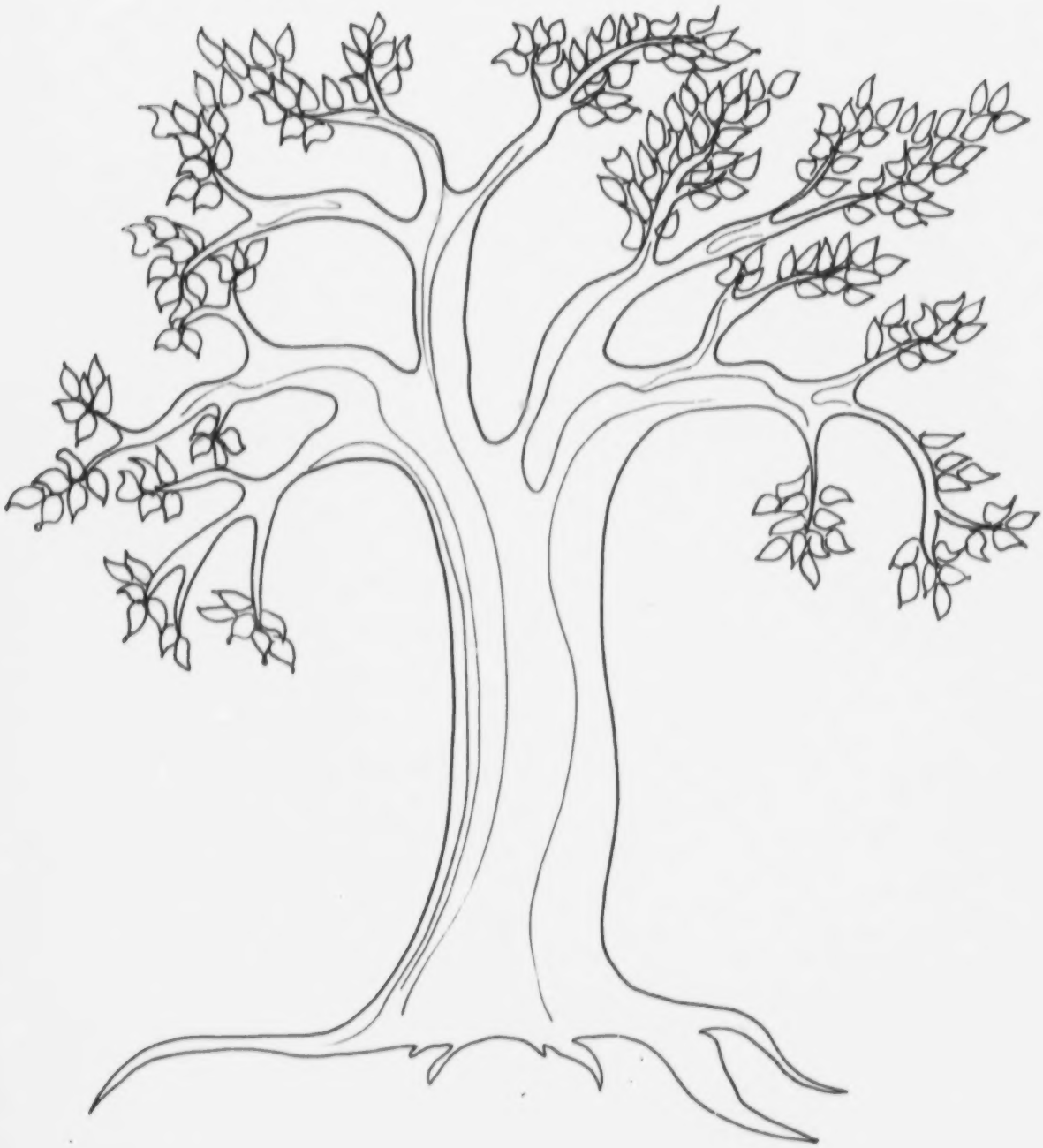
Date **Name**

Nature's Apartment House



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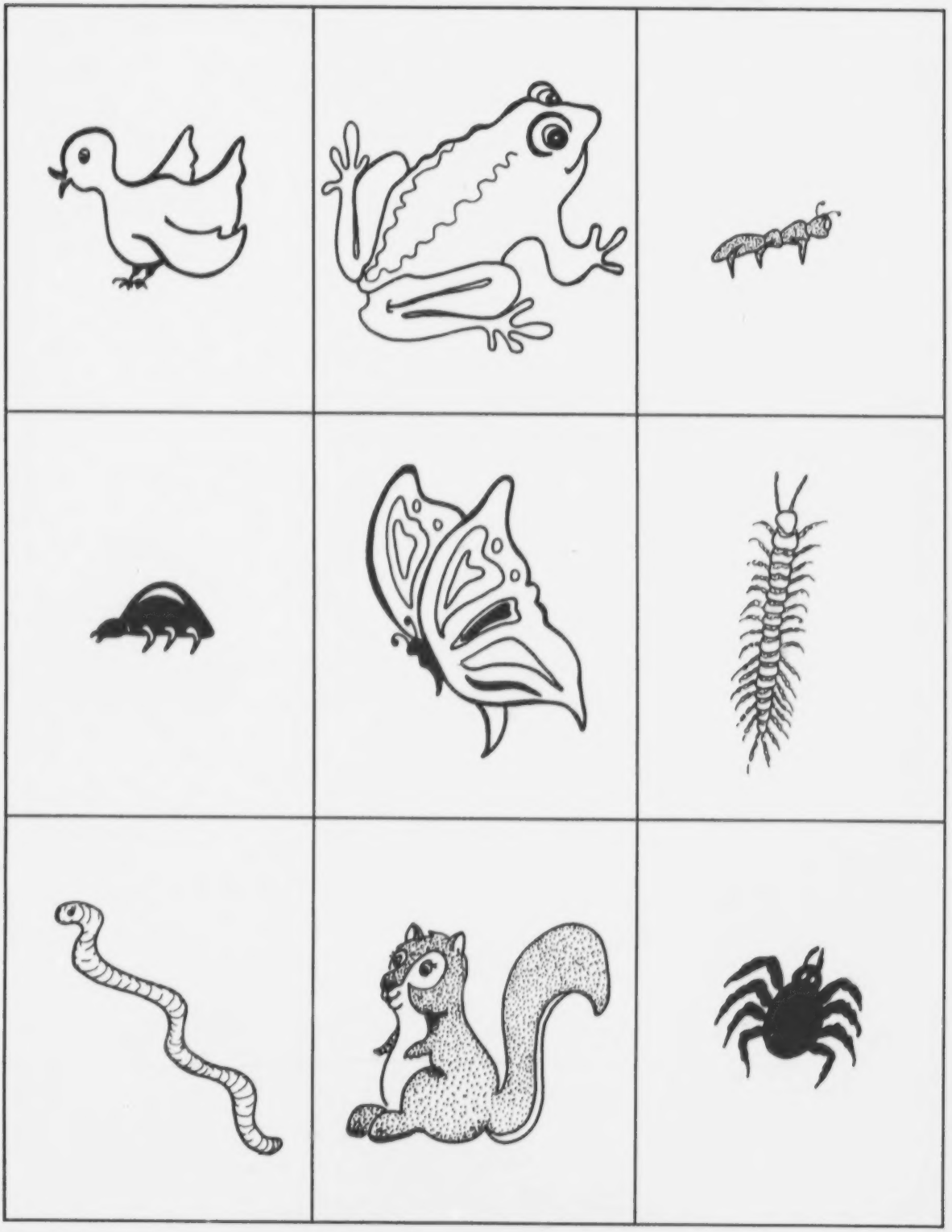
Apartment Dwellers



Nature's Apartment Houses p. 48

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Date **Name**

What my earthworm looked like:

How big my earthworm was:

Down to Earth! p. 50

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